ATHABASCA UNIVERSITY

APPLICATION OF

TELECOMMUNICATIONS DEVICES FOR THE DEAF TO ADULT LITERACY INSTRUCTION IN THE HEARING COMMUNITY

BY

MICHAEL SWEENEY

A thesis submitted to the

Athabasca University Governing Council in partial fulfillment

Of the requirements for the degree of

MASTER OF DISTANCE EDUCATION

Athabasca, Alberta

September, 2005

ATHABASCA UNIVERSITY

The undersigned certify that they have read and recommend to the Athabasca University Governing Council for acceptance a thesis USE OF TELECOMMUNICATIONS DEVICES FOR THE DEAF IN ADULT LITERACY TUTORING IN THE HEARING COMMUNITY by MICHAEL SWEENEY in partial fulfillment of the requirements for the degree of MASTER OF DISTANCE EDUCATION.

Susan Moisey, Ph.D. Supervisor

Patrick Fahy, Ph.D.

Susan Brigham, Ph.D.

Date: September, 2005

DEDICATION

To an exceptional teacher, my father, who taught me to question the unquestionable.

ABSTRACT

A number of researchers have identified that illiteracy is a greater problem in rural than urban areas of Canada. The intent of this research project was to determine if the TDD could be used to improve access to adult literacy services and the quality of instruction that is provided to rural residents. Although TDDs have been available since the 1960s, previously, they have been used for educational purposes only within the hearing-impaired community. This study examined how those who can hear could use the technology. A case study was conducted at a literacy agency that provides basic literacy instruction. In order to address the requirements of the study participants, the study was conducted within an overall action research framework; staff members, instructors, and students participated in both the design and the conduct of learning activities. This allowed the technology to be evaluated in both individualized and small group instruction, and in a variety of face-to-face and simulated distance settings. Findings of the study include: the TDD can be used both as an adjunct to face-toface instruction and as a vehicle for distance learning; students find the device supports attainment of their learning objectives; instructors can envisage how to use the device in distance learning applications; and use of the device needs to be integrated with the use of other instructional technologies. The study also identified limitations of the technology and where technological improvements are required.

ACKNOWLEDGEMENT

The completion of this thesis would not have been possible without the support of a large number of individuals and organizations. For financial support, I acknowledge the assistance of the Department of National Defence Personal Enhancement Program, the Government of Alberta Ministry of Learning, and the Athabasca University Graduate Student Research Fund. Without the financial assistance that these organizations provided, completion of the research associated with this thesis would have been impossible. For technical assistance, I am grateful to the staff members of Huronia Hearing Impaired in Barrie, Ontario. Their always friendly advice ensured that I avoided untold technical blunders. I must also acknowledge the invaluable assistance provided by the staff, tutors, and students of the Barrie Literacy Council. Without their advice, support, encouragement, and, most importantly, participation in this study, it simply could not have been completed. I am also grateful for the exceptional assistance and inspiration provided by my supervisor, Dr. Susan Moisey, and the many recommendations provided by my other two thesis committee members, Dr. Susan Brigham and Dr. Pat. Fahy. Collectively, their assistance ensured that I produced a much more rigorous document than I would have on my own. Finally, I will be forever grateful to my family for their encouragement, patience, and sense of humour while I completed this project. They knew even before I did what its completion meant to me, and they allowed me the time and provided me with the support to see it through to completion. Thank you.

TABLE OF CONTENTS

CHAPTE	R I – INTRODUCTION	1
Ва	ackground	1
U:	se of Distance Learning Technology in Literacy Instruction	1
U	se of Alternative Technologies	4
C	ellular Telephone Technology	4
U	se of the TDD for Instructional Purposes	5
	Origin of the TDD	5
	TDD Characteristics	6
	TDD Communications Capabilities	7
	TDD Instructional Potential	9
S	tudy Intent	10
R	esearch Design	10
Li	imitations	11
	Participants	11
	Methodology	11
	Motivation of Participants	11
	Study Duration	12
D	Description of the Researcher	12
D	Definitions	14
	Literacy	14
	Technology	17

Organization of Thesis	18
CHAPTER II – LITERATURE REVIEW	20
Background	20
Literacy Instruction in Canada	21
Overview	21
Organization	21
Philosophical Origins	22
Characteristics of Teachers and Tutors	23
Characteristics of Learners	25
Theoretical Basis for the Use of Technology	27
Use of Computers for Instruction	30
Overview	30
General Purpose Applications	31
Instructional Software	31
Web-based Resources	33
Concerns	34
Impediments to Effective Technology Use	35
Use of the Telephone for Instruction	39
Use of the TDD for Instruction	42
Summary	43
HAPTER III – METHODOLOGY	45
Introduction	45
Development of the Initial Research Plan	45

Experimental Method	45
Types of Case Studies	47
Preliminary Research Design Conclusions	48
Initial Research Plan	48
Case Selection	50
Overview of Barrie Literacy Council (BLC)	50
Council Structure	50
Study Body	51
Instructional Philosophy	52
Operating Framework	53
Pedagogical Approach	54
Learning Centre	55
Reasons for Selection	56
Equipment Selection	57
Initial Participant Recruitment Plan	58
Initial Participant Training Plan	58
Ethics Review	59
Response to the Initial Plan	60
Revision of the Research Plan	61
Goal of the Revision	61
Action Research	62
Analysis of BLC Membership	64
Tutoro	6.4

Students	66
Revised Research Plan	68
Overview	68
Distance Tutoring Simulation Suite	69
Distance tutoring Handbook	70
Participants	70
Overview	70
Staff Members	71
Tutors	71
Students	71
Participant Training	72
Learning Activities	73
Data Collection Plan	74
Data Collection Methods	74
Nature of Data Collected	76
Data Analysis and Interpretation	76
Triangulation	77
Summary	78
CHAPTER IV – RESULTS AND DISCUSSION	80
Introduction	80
Organization of Chapter	80
Research Question 1 – Technical Viability	81
Technical Performance	81

Ease of Use	83
Research Question 2 – Learning Vehicle	85
Overview	85
Interest and Enthusiasm	85
Meeting Students' Needs	86
Supporting Active Learning	88
Research Question 3 – Instructional Vehicle	90
Research Question 4 – Characteristics of Tutors and Students	
Who Can Use TDDs Effectively	91
Tutors	91
Students	92
Research Question 5 – Supporting Transition to Computer-Based	
Learning	94
Impact on the Literacy Council	96
Introduction	96
Technological Climate	96
Equipment Deficiencies	98
Equipment Accessibility	98
Tutor Training	99
Impact on the Learning Centre	100
Impact on Organizational Objectives	103
Summary	103

CHAPTER V – CONCLUSIONS AND RECOMMENDATIONS	105
Introduction	105
Technical Viability	106
Instructional Utility	108
Learning Vehicle	110
Technological Progression	111
Characteristics of Tutors and Students	111
Implications	113
Training of Tutors	113
Integration of Technology in Instruction	114
Additional Research	116
Revised Envisionment	117
Diffusion of the Innovation	119
Field Deployment	121
REFERENCES	123
APPENDIX A – PARTICIPANT CONSENT FORM	136
APPENDIX B – TDD SIMULATION SUITE INSTRUCTION SHEET	140
APPENDIX C – ADULT LITERACY DISTANCE TUTORING HANDBOOK	141
APPENDIX D – DATA COLLECTION AND ANALYSIS PLAN	208
APPENDIX E – PARTICIPANT COMMENT SHEET	210
APPENDIX F – ANDERSON'S FRAMEWORK FOR EVALUATING THE	
POTENTIAL OF TECHNOLOGY FOR SUPPORTING ADULT LITERACY	
INSTRUCTION	211

LIST OF FIGURES

		<u>PAGE</u>
1.	Ultratec Miniprint 425 TDD	7
2.	Multi-Case, Case Study Design	49
3.	BLC Operating Framework	54
4	BLC Learning Centre	56
5.	Tutor Sub-System	65
6.	Student Sub-System	67
7.	Distance Tutoring Simulation Suite	69
8.	Viking DLE-200B Telephone Line Simulator Device	70
9	TDD Game-Show Simulation Suite	102

LIST OF TABLES

		PAGE
1.	Barrie Literacy Council Demographic Profile by Age Group	51
2.	Barrie Literacy Council Demographic Profile by Literacy Level	52
3.	Barrie Literacy Council Student Computer Usage by Type of Use	98

CHAPTER I

INTRODUCTION

<u>Background</u>

Over the past 50 years, improvements in childhood education have resulted in a significant improvement in adult literacy rates in Canada. Nonetheless, illiteracy remains a serious problem with approximately 22% of the Canadian adult population still not possessing even basic reading, writing, and numeracy skills. Furthermore, fewer than 10% of individuals who could benefit from literacy instruction are actually receiving assistance (Movement for Canadian Literacy [MCL], 2004)

While illiteracy is a problem in all geographic regions, the number of students leaving schools with reading and writing difficulties is higher in rural areas than urban areas (Cartwright & Allen, 2002). Rural residents who require literacy support also face many challenges not experienced by their urban counterparts. These challenges include isolation, lack of access to resources, limited or no public transportation, time needed to cover large distances, cost of long distance calls, lack of facilities, seasonal employment, lack of day care, and confidentiality (The Ontario Rural Literacy Special Interest Group, 1994). The intent of the research project described in this thesis was to determine if a particular technology, the TDD, could be used to improve the quantity and quality of literacy instruction that is provided to rural residents.

<u>Distance Learning and Literacy Instruction</u>

Many authors have examined the use of technology to support education in rural areas. Some authors such as Zucher (1986) have considered the subject from

the perspective of the technologies themselves – their characteristics, their capabilities, their limitations, and so forth. Others, like Bates and Poole (2003), have studied the subject from the perspective of the group to which the technology is to be applied - K-12 children, adult basic education students, and so on. As will be discussed in the literature review, relatively few authors have examined the use of distance learning technologies to support adult literacy instruction.

The use of technology in adult literacy programs began largely through experimentation by innovative and creative practitioners who were attempting to meet the needs of their learners (Turner, 1993). It is now accepted that no single technology can satisfy all the learning needs of all adult literacy students. Because each technology has its own strengths and weaknesses, the generally accepted approach is to use a combination of media, able to do different things and contribute to learning in different ways (Schram, 1977).

Although a variety of technologies including printed resources, audiocassettes, and videocassettes have been used in distance education, most programs have used the telephone or radiotelephone in some capacity. Interest in the use of the telephone and radiotelephone in education has waned in recent years, but it remains a viable technology for delivering certain types of instruction and support. This having been said, little recent research has been conducted on telephone tutoring and support (Simpson, 2002). To illustrate this point, under the listing *Telephone in Education*, the Athabasca University library lists 24 works. Only three of these works date from the past decade, five were published in the preceding 10 years, and the remainder are from earlier years. This dearth of current research

is of concern because the telephone has evolved significantly over the past 20 years - voice and text messaging have become widespread; there are now more wireless than wired telephones in Canada; and special purpose telephones and telephone peripherals have proliferated. The text telephone or TDD is one such device.

While many agencies continue to support distance learning using older technologies, many agencies have shifted their focus to computer technologies. In the United States, for example, the Technology Literacy Challenge Fund has channelled over two billion dollars into computer technology to improve literacy levels. Similarly, the Government of Ontario has funded development of AlphaRoute, an integrated Web-based suite of computer applications to supplement and, in some instances, replace face-to-face instruction (AlphaPlus Centre, 2004).

Many researchers agree that computers can be used very effectively in literacy instruction (Howie, 1994; Kamil, Intrator & Kim, 2000; Jaffee (2001). Kamil et al., for example, have argued that, when using computers, students exhibit a higher level of motivation; they are more likely to revise their work, they spend more time on task; and they improve the overall quality of their work as evidenced by achieving higher grades (p. 778). Researchers have also concluded, however, that computers are not appropriate for all adult literacy learners, or all literacy agencies (Mingle, 1999; Leu, 2000; Jaffee, 2001). These researchers note that: computers have high initial and recurring costs; they require extensive educational and technical support; they are not always accessible, and they need relatively advanced literacy skills to be used effectively.

Use of Alternative Technologies

Baron (2001) argued that the optimum technology for any student or group of students may not be a technology that is currently being used for educational purposes. Citing the pencil as an example, he noted that technologies invariably expand beyond their initial applications, and that technologies used for instruction frequently do not originate as *educational* technologies. The pencil was originally developed by joiners to scribe measurements in wood because lead did not leave a permanent mark like metal pointed scribing tools did. Only later was it used for note taking and other educational applications.

Cellular Telephone Technology

Over the past decade, cellular telephone technology has become very common in Canada. With cellular technology came the capability of transmitting and receiving text messages. Both personal digital assistants (PDAs) and digital cellular telephones are capable of sending and receiving text messages over cellular networks. While cellular technology and text messaging have educational potential (Simpson, 2002), these technologies suffer from several limitations with respect to adult literacy instruction. These limitations include:

- Sending text messages on cellular telephones normally entails using buttons for multiple purposes. This can be confusing for learners just beginning to read and write.
- 2. Normally, cellular phone service is more expensive than regular phone service. This is particularly the case in rural areas.
- 3. Many rural areas of Canada are not serviced by cellular telephone networks.

4. Most cellular devices do not permit simultaneous voice/text communications.
This limits the types of learning activities that these devices can be used for.
Use of the TDD for Instructional Purposes

Origin of the TDD. The TDD originated with two earlier technologies, the teleprinter and the acoustic couple. Teleprinters were desk sized, electromechanical typewriters which, when linked together by either connecting wires or radio signals, enabled what was typed on one machine to be typed simultaneously on other connected machines. Because these machines were first used to replace telegraph keys, and their primary operators were the telegraph companies, they were sometimes referred to as Western Union machines. They also were frequently described by their manufacturer's name and simply called Teletypes (Lang, 2000). Because of their size, cost, and need for dedicated lines (they could not share lines with telephones), Teletypes did not find there way into home use but were used almost exclusively by telegraph companies, the military, news services, and large corporations.

The acoustic couple, later renamed the acoustic modem, was developed in the United States in the 1960s to enable individuals with hearing impairment to communicate over regular telephone lines using teleprinters (Lang, 2000). The acoustic couple converts the electrical signal required to transmit Teletype messages to a quasi-analog signal (tone), and back again. This obviates the need for dedicated teleprinter circuits, and allows teleprinter signals to be carried over regular telephone lines.

To enable teleprinter communications using an acoustic couple, it was originally necessary to place a telephone handset into a cradle on an acoustic couple that was attached to a teleprinter. Later, the acoustic couple was integrated with the teleprinter in a single device, and the first true *teletypewriter* or TTY was created. Today, most TTYs connect directly to the telephone system without the need to cradle a handset – an electronic modem is integrated in the device. A TTY that has been designed specifically for the use by the deaf is known as a TDD.¹

TDD Characteristics. Although original TTYs had the same size and cost characteristics as their teleprinter predecessors, newer models rapidly became smaller and more affordable, enabling them to become practical home and office devices. Standard features on a modern TDD are an integral acoustic modem, a 68 key QWERTY keyboard to enter messages, and a liquid crystal display (LCD) to display one or more lines of text. Some models also incorporate a built in printer so that messages can be printed and saved, while others allow external printers to be attached. If a handset or speakerphone is not incorporated in the device, provision is made for the attachment of an auxiliary device to enable audio as well as text communications. Advanced features found on standard telephones, such as voice and text messaging, are also found on many models. Figure 1 depicts a modern TDD, which is approximately the size of a small laptop computer.

Although there are technical differences between TTYs and TDDs, in common usage the terms are often used interchangeably. The term TDD is used in this thesis because it more precisely describes the technology being discussed and differentiates the technology from other types of TTYs that are still in use.

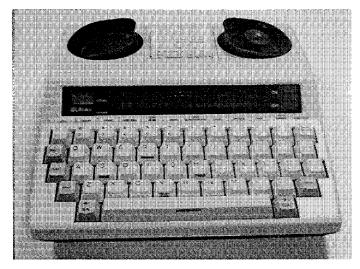


Figure 1. Ultratec Miniprint 425 TDD.

Note: This model of TDD is typical of devices currently in use in Canada. It incorporates a standard QWERTY keyboard, 20 character LCD display, and integral printer. The device normally connects directly to the telephone system; the acoustic couples are only needed for non-standard applications (digital phone lines, irregular line voltages, and so forth).

TDD Communications Capabilities. Most TDDs send and receive messages using the *International Telegraph Alphabet Number 2* (ITA2) code that was developed in the 1920s by the Western Union Company. Commonly, but inaccurately, referred to as *Baudot Code*, a similar but even older technology, ITA2 code allows the transmission and reception of numerals, upper case letters, and a limited number of characters such as periods, question marks, and hyphens (Jennings, 2004).

Some TDD models now permit communications using the newer American Standard Code for Information Interchange (ASCII). ASCII capable TDDs have the dual advantages of (a) being able to send and receive messages using the full complement of upper and lower case letters and typographic symbols; and (b) being able to communicate with other devices, including computers, that use ASCII. Of note, ASCII TDDs normally can also send and receive messages using ITA2 code to ensure compatibility with older devices. Unfortunately, ASCII TDDs are still relatively rare.

An individual equipped with a telephone and TDD is capable of communicating in several different ways. These include:

- 1. Voice-to-Voice. The telephone can be used for normal oral communications.
- 2. Text-to-Text. If both communicants are equipped with TDDs, communications can be entirely text-to-text. Information typed on either machine simultaneously appears on the LCD displays of both devices.
- 3. Text-to-Voice/Voice-to-Text. If one of the communicants is equipped with a TDD and the other is not, communications can be conducted through a relay operator (RO). The RO, who is equipped with a telephone and TDD, converts message from text-to-voice and voice-to-text, as required.
- 4. Voice Carry Over (VCO). This capability is used when one person can speak, but not hear. The person who can speak reads messages displayed on his or her TDD or special VCO telephone, and speaks his/her replies as on a standard telephone. The other communicant listens to the spoken reply and responds either directly, by typing a response on a TDD, or indirectly, by relaying the reply through a RO.
- 5. Hearing Carry Over (HCO). This capability is used *when one communicant* can hear but not speak. The person who can only hear listens using a

telephone and responds by typing replies on a TDD. The other communicant reads the reply on his or her TDD, or listens to the message relayed through a RO. He or she then responds orally using the telephone.

Of note, while most TDDs can be used for all of these functions, models are normally optimized for use in one or more of the operating modes. For example, some models are optimized for text mode communications, while others models are better suited to meet VCO and HCO requirements.

TDD Instructional Potential. As will be discussed in Chapter 2, the TDD has not been used extensively for instructional purposes except by hearing impaired students, who have used it as a substitute for the telephone. Further, little research has been conducted on the use of TDDs as an instructional technology, even as an instructional technology for the hearing impaired. Nonetheless, the TDD appears to have considerable potential and offer a number of advantages over other technologies. These advantages include:

- 1. Cost. Compared to computers, TDDs are inexpensive to both purchase and operate. A full-featured model incorporating messaging, a speakerphone, and a printer costs less than \$700. Moreover, there are no additional costs for software or Internet fees; all that is required is regular telephone service.
- 2. Simplicity of Operation. Individuals can learn to use a TDD with minimal instruction. Further, minimal literacy and technical ability is required; there is no need to be able to read complex drop-down menus or *Help* files.
- 3. Flexibility. TDDs can be connected over telephone lines, using cellular telephones, or in a classroom setting using a telephone line simulator device

- (TLSD). This allows TDDs to be used either for distance education, or as a supplement to face-to-face instruction.
- 4. Portability. TDDs are designed to be portable and can be moved and easily set up by someone with minimal training.
- Availability of Training. Extensive instructional materials are available on operation of TDDs, some of which are suitable for those with only limited literacy skills. These materials include not only paper based resources, but videocassettes and DVDs as well.

Study Intent

As will be discussed in the literature review, the two most common distance learning technologies, the telephone and the computer, can be used to support adult basic education. However, both of these technologies suffer from limitations that restrict their ability to adequately support some students. As a consequence, some students, particularly rural residents, are receiving either no or inadequate literacy support. The intent of this study was to determine if the TDD could be employed as an instructional technology, in conjunction with other technologies, to improve both access to instruction and instructional quality.

Research Design

The study sought to answer the following research questions (RQs):

- 1. Is the TDD a technically viable instructional technology for adult literacy instruction?
- 2. Is the TDD a useful learning vehicle for students?

- 3. Is the TDD a useful instructional vehicle for teachers and tutors?
- 4. What are the characteristics of tutors and students who can use TDDs most effectively?
- 5. Can TDDs assist learners to move to computer-based learning?

Limitations

For reasons that will be discussed in Chapter 3, it was originally intended that the study be conducted as a multi-case study using three or four samples. The study eventually evolved into a multi-case study within an overall action research framework. This design, while well suited to answering the research questions, had several limitations:

- 1. Participants. Although the study was concerned with addressing the learning requirements of rural students, for reasons of practicality, participants were recruited from an agency that served primarily urban students. The assumption that the learning profiles of rural and urban students are similar appears to be reasonable, but is subject to verification.
- 2. <u>Methodology</u>. The equipment and learning materials that tutors and students would use at home were used during the study. However, all research was conducted at a single location in a simulated distance environment.
- 3. Motivation of Participants. All study participants were drawn from a list of individuals who had already sought literacy instruction at an adult literacy agency. These individuals may not have been representative of the general population of individuals who need literacy instruction. Indeed, only about

- 10% of Canadians who require literacy support are actually receiving such assistance (MCL, 2004).
- 4. Study Duration. The research phase of the study was only eight weeks long. This limitation arose from a combination of practical and situational factors. The most significant practical consideration was that only limited funding was available for the rental of the equipments that were used in the study. The most significant situational factor was that the study was conducted in April and May, immediately before the literacy agency's summer break period. Because the agency's training schedule and hours of operation change for the summer months, the study could not be extended easily.

The upshot is that the study provides an understanding of the impact of the technology on a particular group of students and organization at a particular place and time. Although the study limitations preclude the results being extrapolated directly to other situations and other educational envisionments, they do not invalidate the study. To the contrary, the study methodology was sufficiently robust to enable general conclusions to be drawn about the educational potential of the technology, and the need for additional research. In essence, the limitations did not restrict the ability of the study to validate the concept of using the TDD as an adult literacy instructional technology.

Description of the Researcher

Although a significant number of individuals participated and supported the study, the author conducted all of the research himself. Because qualitative research is "fundamentally interpretive" (Creswell, 2003, p. 182) and "no matter how much

you try you cannot divorce your research and writing from your past experiences" (Bogdan & Bilken, 1998, p. 34), an appreciation of the author's background and perspective is essential to understanding how the study evolved.

The author was born in Newmarket, Ontario in 1953 and educated in public and separate schools in the province of Ontario. While attending high school, he joined the Canadian Army Reserve and received instruction in leadership and instructional technique. After completing high school, he attended the Royal Military College of Canada, graduating in 1977 with an honours degree in history. During the succeeding 25 years, he alternated between operational assignments in infantry units, and instructional and training positions in Canadian Forces schools and headquarters. His training and education accomplishments include serving as Commanding Officer of an 800 member regular/reserve operational training unit, designing the Caribbean Junior Command and Staff Course for the Jamaican Defence Force, serving as a curriculum designer and instructor at the Canadian Land Forces Command and Staff College, and serving as the head of the operations and training staff in the headquarters of the Canadian Forces Recruiting, Education and Training System. The highlight of his military career was a 15 month tour with the United Nations Iraq/Kuwait Observation Mission, when he commanded and was responsible for the training and readiness of 200 personnel from 32 countries.

While with the Canadian Forces, the author attended a variety of leadership and management courses. He is a graduate of both the Canadian Land Forces Command and Staff College and the Canadian Forces College, and has attended a variety of instructional technique and training management courses. Early training

courses that he attended focussed on the use of behaviourist instructional methods, but later training included some material of a progressivist nature. This was especially the case with training related to the education and training of officers, who must be able to solve problems, develop plans, and communicate effectively.

Although self-educated on technological issues, the author was selected to design the technology component of the Army's intermediate officers' course because of his interest in technological matters. While most of the author's instructional experience has been in face-to-face programs, his recent experience includes the design and delivery of courses using correspondence materials, computer mediated communications, teleconferencing, and videoconferencing.

Following his retirement from the Canadian Forces in 2002, the author enrolled in Athabasca University's Master of Distance Education program. In 2003 he completed the Laubach Literacy Canada Basic Reading and Writing Tutor course. Since completing the course, he has devoted over 400 hours of volunteer tutoring support at his local literacy council.

Definitions

Literacy. In common usage, the word *literacy* has the meanings of *the state of being able to read and write*, and *the state of being educated or cultured*. Anderson (1991) indicates, however, "Literacy is an elusive concept for it is both relative and dynamic" (p. 6). Similarly, Askov (2001) reports that consensus about what it means to be literate has never been reached. Askov indicates that positivists define literacy as the ability to achieve identifiable minimum skills to function in society, while socioculturalist/constructivists define it as possessing "those skills, knowledge, and

practices that are needed to function successfully in the society or culture in which the individual is situated or desires (and has potential) to be situated "(The Evolving Concept of Literacy section, ¶ 4).

While positivists assess literacy in terms of how well individuals do on objective tests, socioculturalist/constructivists evaluate it in terms of how well they are able to achieve the literacy goals that they set for themselves. Askov (2001) indicates that these goals can be expressed in terms of the ability of the learner to meet four criteria: (a) to gain information (access); (b) to express oneself (voice); (c) to take independent action; and (d) to enable one to enter further education, training, and so forth (bridge to the future)" (The Challenge section, ¶ 3).

Defining literacy is further complicated by the rapidly changing nature of information technology. While the definition of educational technology will be discussed at some length in the next section, Leu (2000) indicates, "Today, changing technologies for information and communication and changing envisionments for their use rapidly and continuously redefine the nature of literacy" (pp. 744-745). Similarly, Reinking (1998) noted that our understanding of what being literate means is being transformed by the move from literacy based on the printed page, to literacy based on digital displays on computer screens. Reinking, in fact, differentiated between typographic and post-typographic literacy. Narrowly defined, *typographic* alludes to the technologies of print such as paper, ink, presses and typewriters. More broadly defined, it includes technologies such as laser printers and fax machines that artificially produce or simulate documents. Post-typographic refers to text displayed electronically "on dynamically alterable surfaces such as computer

screens" (pp. xx-xxi). As Tuman (1992) explained, "hypertext fundamentally alters our primary notion of what it means to read" (p. 75).

Reinking's and Tuman's views of literacy are similar to that of Howie (1994), who described our society as *post-literate*. Prior to invention of the printing press we were *preliterate*, with the invention of the printing press we became a *literate* culture, and with the transformation brought about by the computer we are becoming *multiliterate*. In a multiliterate society we learn and take in information in many different ways, e.g. texturally and visually. Howie acknowledged that this transformation is not complete as segments of our population are as yet unable to seek and take in information from other than printed artefacts – books, newspaper, and so on.

Bearing in mind that the intent of this research project was to examine how one particular technology, the TDD, could support literacy instruction, it is not necessary to definitively define the term *literacy*. Nonetheless, a clearly understood working definition is necessary. Defining *literacy* too restrictively could exclude certain types of learning that are highly relevant. Conversely, defining the term too imprecisely could make any type of meaningful measurement impossible. In the thesis, the term is therefore defined as "the ability to understand and express oneself in text based media to the degree needed and desired to achieve one's goals." This definition is flexible enough to address variations between individual learners, yet still be measurable. Because to be measurable this definition imposes upon the learner the requirement to enunciate his or her own literacy goals, this requirement is addressed in the research design.

Technology. If there is no common consensus on what it means to be literate, neither is there a common understanding of what constitutes educational *technology*. Kamil et al. (2000) noted that in current usage the word *technology* typically refers to computer technology, disregarding all other technologies. Reinking (1998) surmised that, "The tendency in the previous 15 years to view the topic of technology and literacy as synonymous with computers is explained partially by the fact that during the lifetimes of most people living at the turn of the millennium, printed materials will still have been the dominant technology for writing and reading" (p. xvii). Reinking went on to note, however, that, "... the fact that technology for at least three centuries prior to 1980 was rarely discussed in the context of literacy does not mean that technology had no bearing on literacy; it only means that its influence was subliminal" (p. xvii).

Bates and Poole (2003) expanded on this theme and defined educational technology both inclusively and comprehensively. According to their definition, educational technology encompasses not only the actual tools, but also the skills needed to use them; the understanding of how the technology can be used to support learning; the human resources needed to make effective use of them; and the organization required to enable appropriate use. Thus, educational technology spans the gamut from picture cards used to teach children with autism, to handwriting, to printed books, to PowerPoint presentations, and online streaming video.

Franklin (1999) developed this idea even further by defining technology as a system and linking it to culturally and socially accepted practices and values.

Technology therefore entails more than material components and processes and involves "organization, procedures, symbols, new words, equations, and most of all, a mindset" (p. 3); technologies are ways and practices of doing things. Underlying Franklin's understanding of technology is the concept that technology is not just machines and processes, but practices that have profound and often unintended and unnoticed impacts on our lives, our culture, and our social and individual relationships.

In this project, the preferred definition of technology is the one that Anderson (1991) used when assessing a variety of adult literacy technologies: "Technology is more than equipment; it also embraces the way in which equipment and materials are used and the learning experience provided" (p. 9). This definition, which Anderson adopted from a report of the Australian House of Representatives Standing Employment on Employment, Education and Training, is inclusive and allows for the diversity of technological considerations that both Franklin (1999) and Bates and Poole (2003) identified as being critical.

Organization of the Thesis

The remainder of this thesis consists of four additional chapters, a reference list, and appendices. The second chapter is a literature review of the theoretical foundations of the use of technology in literacy instruction and distance education. This chapter also discusses literacy instruction and volunteerism in Canada and how computers, telephones and TDDs are currently being used for instructional purposes. The third chapter deals with the research methodology including a discussion of the research design, instruments, and data collection procedures. The

forth chapter discusses the results of the study, and the final chapter 5 presents conclusions and recommendations for further research. Appendices include an instruction sheet for the TDD simulation suite used in the study, the Adult Literacy Distance Tutoring Handbook that was developed during the course of the study, a tabular summary of the data collection plan, a participant comment sheet, and a guide for evaluating the potential of technology for supporting adult literacy instruction.

CHAPTER II

LITERATURE REVIEW

Background

Kamil et al. (2000) noted that there is a paucity of research on literacy instruction and technology, citing that "Between 1986 and 1996 the proportion of all research articles on reading and writing that dealt with technology only ranged between 2% and 5%" (p. 772). Leu (2000) agreed with this assessment and further noted that earlier and ongoing research into the use of technology in literacy instruction may not be transferable, noting that "As newer technologies of information and communication continually appear, they raise concerns about the generalizability of findings from earlier technologies" (p. 749). Leu went on to indicate that research into the issue of the impact of technology on literacy is complicated by the fact that individuals create their own *envisionments* for literacy within each technology.

Envisionments take place when individuals imagine new possibilities for literacy and learning, transform existing technologies to construct this vision, and then share their work with others (Leu, Karchmer, & Leu, 1999). These envisionments are defined not only by the technologies themselves, but also by social context. Thus, for a single technology there may be multiple envisionments and, while research conducted within one envisionment *may* transfer to other envisionments, it is equally possible that it may not. Furthermore, iterations of technology can also affect outcomes; one version of a technology may be a success for a particular application, while a subsequent version may fail. In summary, we

simply need to know more about what the effect of using technologies has on literacy (Kamil et al., 2000).

This chapter examines how adult literacy instruction is currently provided in Canada, and then considers the theoretical basis for the use of technology in instruction. Several educational philosophies that underlie adult literacy instruction are examined and literature on the two most prevalent modern technologies being used in adult literacy instruction at a distance, the telephone and the computer, are considered. The chapter concludes by looking at the potential of the TDD to perform as an educational technology.

Literacy Instruction in Canada

Overview. An understanding of how adult literacy instruction is delivered in Canada is important to this discussion because it affects what technologies are used, how, and under what conditions. While as Franklin (1999) indicates, technologies can and do transform organizations, the transformation process does not occur instantly, and is affected by earlier technologies that were and continue to be used. Thus, an understanding of how literacy instructional technologies are currently used is important to understanding the potential of new innovations.

Organization. Face-to-face adult literacy instruction in Canada is delivered primarily by a network of independent, government funded literacy councils that are staffed by small cadres of full-time staff and larger numbers of volunteer tutors. Because of changes in Canadian society, these organizations are evolving quite rapidly both in the type of clients that they serve, and the type of instruction that they provide. Perhaps no greater change is taking place than the introduction of new

technologies in the instructional field. Most significantly, computers now are being used to supplement and in some instances replace traditional face-to-face instruction.

Philosophical Origins. Mason (2001) noted that Canada's adult literacy movement has its philosophical roots in earlier Canadian adult education movements such as the Women's Institutes, Frontier College, and the Antigonish Movement. As such, it reflects a variety of philosophical perspectives including liberalism, progressivism, and humanism. Liberalism is seen in the movement's focus on clear learning objectives that are linked to established standards (e.g., achieving grade 9 English). Progressivism can be seen in the cultivation of personal and social development, while humanism manifests itself in efforts to foster self-esteem and self-actualization. Although the emancipatory character of the literacy movement has dissipated somewhat in recent years, it lives on in some important respects. In particular, one of the stated objectives of the MCL, the umbrella organization for adult literacy instruction in Canada, is to "strengthen the adult student/learner voice in Canada" (MCL, 2004, ¶ 1).

In keeping with the literacy movement's origins, churches, labour organizations, and private donors continue to provide significant financial support to literacy instruction. This having been said, various levels of government have in recent years become literacy's primary benefactors. Jointly, various federal and provincial agencies fund approximately 75 percent of all adult literacy instructional costs.

Characteristics of Teachers and Tutors. Historically, adult literacy instruction in Canada has been based upon volunteerism. The adult literacy movement has also had an emancipatory character (Selman, Cooke, Selman & Dampier, 1998; Mason, 2001). Intentionally, the motto of one of Canada's largest adult literacy organizations, Laubach Literacy Canada (LLC), "Each one, teach one", connotes both that instruction will be individualized, and that those who can read have an obligation to instruct those who cannot.

The Canadian Centre for Philanthropy (CCP) has conducted extensive research into volunteerism in Canada. In adult literacy agencies, just as in all volunteer organizations, the characteristics of volunteers are changing. While both the number and percentage of Canadians who volunteer have increased over the past thirty years, the amount of time that *individual* volunteers contribute has decreased (CCP, 2004b). Nationally, over one-third of all volunteer hours are contributed by just five percent of volunteers, and almost 40 percent of all hours are contributed by just another 20 percent of the volunteer population (CCP, 2004a). This change in how Canadians volunteer is important because it means that the *quantitative* return that literacy organizations can anticipate on tutor training is decreasing. Consequently, to maintain their current levels of service, they must either train more volunteers, or increase the effectiveness of the volunteers.

McClintock (2004) reports that the primary barrier to volunteers contributing more, and non-volunteers beginning to contribute, is lack of time. Seventy-five percent of volunteers and 69 percent of non-volunteers reported lack of time as their primary barrier to volunteering and volunteering more (p. 3). McClintock indicated

that these figures are even higher for younger volunteers, "Younger volunteers were more likely to say that they did not volunteer more because they did not have any extra time. Eighty-three percent of volunteers aged 25-34 cited this reason, as did 84% of those aged 35-44" (p. 8). The amount of training that volunteers can both undergo and provide is constrained by (a) the high activity levels of the small segment of the population that does most volunteer work, and (b) the limited amount of time that younger volunteers have available. Both of these factors suggest that any technology that tutors must use must either already be familiar to them, or easily and quickly learned.

Imel (1996) reported that literacy educators are shifting their focus from discrete reading and writing skills to the expressed needs of the broad spectrum of current and potential adult learners, emphasizing literacy for access, literacy as voice, literacy as a vehicle for independent action, and literacy as a bridge to the future. Imel also noted that increasing numbers of adult literacy educators now advocate understanding learners both as individuals and as members of their cultural groups/communities.

Most literacy volunteers in Canada are still trained primarily in the use of oneon-one, face-to-face tutoring techniques. For example, the recently revised LLC
specification for basic tutor training prescribes only 10 minutes of instruction on the
use of computers in the seventeen-hour basic tutor course (LLC, 2003). Similarly,
Harwood (2001) only very briefly mentions use of computers in the *Handbook for Literacy Tutors*. This apparent aversion to the use of technology by literacy
practitioners does not appear to be unique to Canada. Pachon, Macias and Bagasao

(2000), reporting on a three-year study exploring access to advanced information technologies and related training in low-income and minority communities in the United States, found that practitioners continued to question the efficacy of technology in the classroom. Similarly, Askov, Johnston, Petty and Young (2003) found that the change in the role of the instructor from direct deliverer of instruction to facilitator of learning that accompanies the introduction of computer assisted instruction is threatening to some instructors. They added that, "This vision is difficult to change when most instructors are part time and inservice [training] is usually not systematic and long term" (p. 162).

Although there is evidence of reticence on the part of some adult educators to use computers in literacy instruction, adult educators are, in general, in favour of the use of technology in education (Hopey, Harvey-Morgan, and Retheymeyer, 1996; Kunz & Tsoukalas, 2000). In a study in the United States, Hopey et al. observed that while there was some resistance and questioning about the *effectiveness* of using technology in the classroom, the overall interest in using technology was high. Further, they found that many literacy practitioners used technology for administrative, instructional, assessment, and networking purposes. Moreover, at least 83 percent of instructors and tutors used one or more forms of low-end technology including the VCR, audio tape player, overhead projector, video camera, and broadcast television (p. 30).

<u>Characteristics of Learners</u>. The National Literacy Secretariat, funded by Human Resources and Development Canada (HRDC) has examined extensively the segment of the Canadian population that requires additional literacy instruction.

HRDC (2002) indicates that most Canadian adults with acknowledged literacy problems have personal and/or learning difficulties as well. Adults with literacy problems also have much in common with each other including the following: (a) learning disabilities and other reading-related problems; (b) unemployment and reliance on government assistance; and (c) low self-esteem and associated social problems.

Smith (1999) found that adults with literacy problems have only two-thirds the income of other Canadians; they are twice as likely to be unemployed, and they are much more likely to receive some form of social assistance (p. 13). Similarly, Skinner, Gillespie and Balkam (2000) estimate that up to 80 % of illiterate adults in the United States suffer from some form of learning disability, and these learning disabilities limit their ability to learn through conventional teaching methods (p. 148).

Anderson-Inman and Horney (1998) report that at-risk readers often find themselves unprepared to learn new information due to poor content literacy skills. They propose that reading entails decoding text, constructing meaning, recognizing and interpreting figurative language, integrating new information with prior knowledge, separating important information from supporting detail, synthesizing information by forming a mental image, questioning how well the information is understood, and identifying corrective procedures to fill the gaps. They hypothesized that at-risk readers have difficulty with one or more of these steps: an inability to understand leads to frustration; frustration leads to a loss of interest; loss of interest leads to less reading; less reading exacerbates the initial problem; and the cycle repeats itself. To break this cycle, they proposed the use of *supportive text*.

Supportive text incorporates a variety of text enhancements or electronic resources to promote improved comprehension, which potentially could reverse the cycle. They conjectured that improved comprehension would increase interest; increased interest would lead to an increase in the amount of reading; and increased reading would help to resolve the original comprehension problem.

Theoretical Basis For the Use of Technology

Considering computers in particular, Turner (1995) found that the value of technology for literacy instruction is based on its provision of privacy, individual control, immediate feedback, and flexibility for learners. While there are a variety of reasons for introducing technology into literacy instruction, Herod (2000) argued, "The key consideration in any deliberative process must be the efficacy of computers in terms of educational outcomes" (p.6) This view echoed Knuth, Hopey, and Rocap (1996) who argued that technology should not drive educational decisions or learning, rather, decision-making should be based on the learning and teaching needs of the student. (p. 9). Knuth et al. further argued that technological solutions must be realistic in scope and economically and technically feasible; technology plans must be driven by educational goals and objectives, rather than simply by technological developments.

Writing on literacy as a technology, Baron (2001) suggested that for any literacy technology to take hold it must do something that earlier or other technologies do not do. Imel (1996) advocated the following guidelines for the use of technology in adult and vocational education:

1. Let learning outcomes drive the process of technology choice.

- 2. Strive to infuse and/or integrate technology into the instruction.
- Use technology to shift the emphasis in teaching and learning.
- 4. Be prepared to modify the role of the instructor.
- Use Technology to move the focus away from low-level cognitive tasks to higher order thinking skills.

In the same vein, both Padolia (1997) and Bates and Poole (2003) indicated that, when deciding what media and technologies to combine, distance education program providers must consider the following: (a) each technology's accessibility for learners and flexibility for the target group; (b) each technology's cost structure and per learner cost; (c) the best technologies for supporting the types of learning and instructional approaches required; (d) organizational requirements and barriers to be removed; (e) each technologies novelty; and (f) the speed with which courses using each technology can be mounted and revised.

Several researchers have attempted to better define how technology is used in adult literacy instruction. Ginsberg (2001) classified its according to the role that it played. The four roles that he identified were (a) technology as curriculum, (b) technology as the delivery mechanism, (c) technology as a complement to instruction, and (d) technology as an instructional tool.

Technology as curriculum entails extensively or exclusively using a computer
to acquire information and competence in using specific technology
applications. For example, to acquire word processing skills, the student may
complete a prescribed series of progressively more complex word processing
assignments.

- 2. Technology as a delivery mechanism entails using individualized learning systems that have been designed to provide instruction and practice in each of the subskills that together form an entire curriculum. Teaching machines that enable learners to progress from one subskill to another after achieving a predetermined level of mastery are examples of such a system.
- Technology as a complement to instruction entails using technology to supplement or complement face-to-face instruction. Computer programs designed to practice specific skills are examples of this technology.
- 4. Technology as an instructional tool entails using technology in an instructional setting, as it would be used in day-to-day life. The development of technology-related skills is a valued, but secondary, outcome of instruction. Use of generic computer applications such as word processing software to complete homework assignments is an example of this approach (Ginsberg, 2001, pp. 39-40).

Ginsburg (2001) indicated that when technology is used in a complementary role, the instructor essentially becomes the coordinator of instruction. The extent to which the instructor integrates technology-based activities with other activities varies with the instructor's style, the kinds of technology employed, and whether learners are assigned to work independently or collectively. Ginsburg emphasized that when technology is used in instruction, instructor involvement is still critical since technology itself is inherently inflexible, "If teachers are unable or unwilling to be creative in this regard, the learners may be learning on two separate trajectories that are not integrated and cause confusion rather than clarification (p. 40). Ginsburg

also noted that the use of technology to complement face-to-face instruction requires that teachers rethink and modify face-to-face activities so that they can use technology-based activities to achieve best overall effect. While Ginsburg was commenting specifically on the use of computer technology, it reasonably can be assumed that these recommendations apply to other technologies as well.

Use of Computers for Instruction

Overview. Computers have been used by literacy organizations for a variety of purposes since the 1970s. Their use for instructional purposes did not become commonplace, however, until the 1990s. Today computers are used for a variety of instructional purposes including using general-purpose applications such as word processing and E-mail, running purpose designed instructional programs, and providing online instruction. This sections reviews how computers are currently being used to support basic literacy instruction, the capabilities and limitations of this technology, philosophical concerns about the use of computers as instructional vehicles, and impediments to their application.

Turner (1993) identified that the value of computer technology for literacy instruction is based on its provision of privacy, individual control, immediate feedback, and flexibility for learners. Turner cautioned, however, that the process of selecting appropriate technology must take into account the larger themes and issues being debated in adult literacy, including the nature of learning, the purpose of literacy instruction, and issues of evaluation and accountability. Turner contended that because of the marked differences among the various types of computer

programs, context should be the primary determinant in the selection of the most appropriate technology.

General-Purpose Applications. Skinner et al. (2000) indicated that although often overlooked as a literacy instructional technology, word processing is still the most significant contribution that computer technology has made to adult basic education. They indicated that that they had found it best to use software "that allows learners to concentrate on the writing itself without wading through layers of user interface, which can cause confusion and undermine self-confidence" (p. 160). Hopey (1998b) also held this view and indicated that one of the lessons that can be captured from the experiences of adult educators is to "keep things simple" (p. 47). Hopey contended that technology itself creates cognitive overloads; there is no reason for educators to make things more complex than they have to be.

Similarly, Turner (1998) indicated that one of the most successful uses of the computer in adult literacy instruction is simply to allow students to access information through the Internet. Turner further noted that the increased access to information that the Internet affords is extremely important for teachers as well, as are online chat groups and websites devoted to serving the needs of specific populations. She noted, "It is to be hoped that new technologies that connect people around the globe will afford increased options for learners to learn English in ways that have yet to be fully conceived, much less employed" (p. 69).

Instructional Software. In addition to generic programs, a multitude of instructional software programs are available to support literacy instruction. Ginsburg (2001) noted that the educational content of these programs range from drill and

practice of routine arithmetic computations to complex simulations that require significant content knowledge, creativity, and an ability to integrate ideas from separate curricular areas. Ginsburg indicated that the main benefit of using commercially created software is that teachers do not need to create individualized resources for individual learners. Using good quality software can also provide learners with a variety of experiences that are not limited by the knowledge or experiences of the teacher. Additionally, some learners appreciate the opportunity to practice a target skill in private with immediate feedback. These learners may feel uncomfortable stating in front of their peers that they are not ready to move on.

Ginsburg (2001) also indicated, however, that commercially available software is of varying quality, and its acquisition and maintenance costs can be high. Furthermore, most literacy software is designed for children and not ideally suited for adult learners. Identifying the most appropriate technology for a particular student or group of students can also be difficult. While many organizations are developing databases of software reviews to ease this burden, making appropriate choices for specific teachers, learners, and programs often requires extended time for research and experimentation.

Jaffe (2001) concurred with this assessment and indicated that the assessment and evaluation of technology is a continuing problem for literacy organizations because many literacy practitioners lack sufficient information on how programs can be used to enhance literacy instruction. Jaffe noted that this situation is complicated by the lack of common performance standards to compare software,

and a shortage of staff in literacy organizations with expertise in both adult literacy instruction and technology.

Web-based Resources. Web-based resources that integrate a variety of different applications are now beginning to supplement individual applications. By combining many of the best features of various applications with communications technology, the intent is to create highly integrated and supportive learning environments that can be accessed from any computer with Internet access. By utilizing a common interface and family of applications, Web-based applications can also be easier for practitioners to learn. Further, Web-based applications can be accessed from any computer with Internet access, whereas commercially available instructional programs are only accessible on computers on which they have been loaded. *AlphaRoute* is one such Web-based suite of applications.

AlphaRoute was developed for the Ontario Ministry of Training, Colleges and Universities and is now also being used in several provinces. AlphaRoute is of particular interest in this study because it is the most widely used Web-based application in Canada, and it is being used in Ontario where this research project was conducted. AlphaRoute offers an individualized training plan and a personal list of learning activities for each learner; an individualized portfolio that saves the results of completed activities for the learner and the mentor to view; a communication system that includes a discussion board, a chat feature, and internal email; audio and visual supports; and learning activities created by literacy practitioners in Ontario for building reading, writing, and numeracy skills (Alphaplus

Centre, 2004). In December 2004 a new module was added to the suite to assist assessors to conduct learning need assessments.

Larocque (1999) indicated that AlphaRoute has proven to be an effective vehicle for supporting many learners. After using the suite of applications for only eight weeks, many learners demonstrated improved cognitive skills and reported that they found what they learned in AlphaRoute could be applied in real life situations. Learners also reported improving their basic computer skills and ability to assist one another with both literacy and computer problems. Larocque noted that, overall, learners exhibited a variety of independent behaviours, explaining that "In the data, we see four main types of independent acts: the ability to navigate (functional independence), feeling good about learning (emotional independence), developing means to learn (cognitive independence), getting results and transferring learning results to other situations (meta-cognitive independence)" (p. ix). Larocque (1999) also indicated, however, that Level 1 learners, those with the lowest literacy ability, routinely experienced difficulty with the suite due to its complexity and their lack of literacy skills.

Philosophical Concerns. While literature in the field suggests that computers can effectively support some types of literacy instruction for some types of learners, computer assisted instruction (CAI) does have a number of critics. Franklin (2000) cautioned that technology supported education faces three social and political difficulties: the first is caused by the displacement of people by devices; the second by the underestimation of the tasks performed by those learning together; and the third by the "increase of asynchronistic modes of doing things and the resulting

social time-space dislocations" (p. 169). She concluded that if technological devices are applied without an adequate understanding of the social processes of teaching and learning, "the whole enterprise can be at risk" (p.170).

Franklin's concerns are similar to those of Selfe (1999). Selfe suggested that the complex cultural formations of technology and literacy have become linked in ways that actually exacerbate current educational and social inequities (p. 7). Writing on the use of technology in literacy instruction in the United States, she indicated that computers continue to be distributed differentially along the related axes of race and socio-economic status, and this distribution contributes to ongoing patterns of racism and to the continuation of poverty. (p. 135). She surmised that the juxtaposition of technology and the arts in our society has created conditions that discourage the use of technology to resolve human issues such as illiteracy.

Askov et al. (2003) described this situation as a "digital divide," between the "haves" and "have-nots" of technology. Those who are educated and have access to technology are able to obtain jobs and achieve economic prosperity; those who are not educated, tend not to have access to technology, and do not hold jobs that form a meaningful career path. Without access to and knowledge of the Internet and online learning, low-literate adults have little chance of successfully bridging the divide (p. 7). This combination of factors leads to feelings of inadequacy, low self-esteem, and fear of technology, all of which impact negatively on learning. Impediments to Effective Technology Use

A number of researchers have identified a number of problems with the use of technology in adult literacy instruction. Brickman, Braun, and Stockford (2000)

reported, for example, that, in the adult literacy system that they examined, lack of support and lack of time were both major issues. Even though a great deal of hardware and software was available to teachers and students, inconsistent hardware performance and Internet connectivity, combined with a lack of technical support, limited the meaningful and effective use of computers. They further noted, "without a 'critical mass' of staff skilled and experienced in the use of computers, all aspects of planning and implementing computer related activities were perceived as being unduly time consuming" (p. ii). Brickman et al. concluded that much more time needed to be allocated to training in order to maximize the *effective* use of technology. As previously discussed, this is serious challenge to organizations that are dependent upon volunteers.

Turner (1993) noted that in spite the fact that technology is now an accepted part of schooling for children, the use of computers continues to face resistance among some adult educators. She attributed this resistance to the sharp contrast between the underlying philosophy of adult education and that of computer instruction. The field of adult education is highly humanistic and process-oriented, emphasizing internally driven goals and objectives, and contrasts sharply with the behavioural approach found in most software design (p.5).

Jaffee (2001) identified a variety of issues that limited the effective use of technology by literacy organizations. Lack of funding restricted both the acquisition of technology and the training of staff. Compounding this problem, restrictions on how funds could be expended sometimes prejudiced overall service delivery (e.g., a funding provider might allow funds to be used for the purchase of equipment, but not

allow them to be used for critical staff training). Insufficient funding also restricted staff development, both the training of instructors/tutors and staff trainers.

Jaffee (2001) also identified a number of factors that limited access to technology. Computers at public facilities such as community centres and libraries often lacked specialized literacy software. On the other hand, literacy agencies sometimes had the necessary software, but were unable to use it because they had insufficient numbers of modern computers and/or they lacked Internet access.

Jaffee further noted that lack of technical support was a major problem that confronted many literacy organizations. Many organizations had large numbers of inoperable machines because they did not have the financial resources or expertise to maintain them. Finally, staff members often did not have the time or expertise to integrate available technology into existing programs.

Askov et al. (2003) questioned both the advisability and practicality of using online instruction for *adult basic education*. They noted that, in order to study successfully at a distance, students need to possess certain characteristics. Successful distance learning students are likely to be self-motivated, be comfortable working independently, and possess strong study and organizational skills. They also must be at least minimally competent in operating a computer and accessing information on the Internet. Askov et al. contended that only a subset of adult basic learners possesses these characteristics and skills. Barker (2005) agreed with this assessment and noted, "many learners do not have easy access to computers and the Internet, and many learners do not have experience with computer skills" (p. 10). Skinner et al. (2000) cautioned, "Computer enthusiasts often forget that many basic-

level literacy students cannot read well enough to decipher a file or menu, follow instructions on a monitor, and utilize Internet or Web resources" (p.160).

Askov et al. also identified a number of organizational and administrative concerns with online learning. They noted that while most adult education programs use computers in instruction, some learning centres have access only to outdated systems that are not capable of connecting to the Internet. As Hopey et al. (1996) noted, "The data suggest that adult literacy programs are generally relying on trailing-edge technology, with the exception of those programs with large budgets or access to other organizational resources" (p. 7).

Kunz and Tsoukalas (2000) provide a comprehensive report on the use of technology in adult literacy programs in the Province of Ontario. They found that while 83% of teachers owned a computer and almost all teachers routinely used the Internet, only 30% of literacy students owned a computer and only 32% of students used the Internet on a daily or frequent basis. Access rates for students in community based literacy programs were even lower. Students and educators reported that lack of funding, lack of appropriate software, lack of staff training, outdated equipment, and too few computers were all barriers to increased use of computer-assisted instruction. Of these problems, lack of funding appears to be the most significant issue. Only 26% of households with an annual family income of less than \$20,000 owned a computer.

One of the difficulties with the study conducted by Kunz and Tsoukalas (2000) was that it examined only computer and Internet accessibility for students *registered* in literacy programs. As previously indicated, program accessibility is a serious

problem for rural residents (Ontario Rural Literacy Special Interest Group, 1994). Kunz and Tsoukalas reported that 74% of students who used computers accessed them at the school or agency where they studied. The implication is that the majority of literacy students have access to a computer and the Internet *only by virtue of participation in literacy programs*. This in turn implies that if an individual cannot participate in a literacy program, as is the case with many rural residents, they are unlikely to have computer or Internet access. Unfortunately, the situation may be even more serious than these figures first suggest because its known that rural residents have reduced access to public computers, like those found in libraries and community centres. Further, adults have even more restricted access to computers than children, because children normally have at access to computers at school.

Hopey et al. (1996) summarized the impediments to delivering adult literacy instruction using computers as follows: (a) lack of financial resources; (b) restrictions on the use of governmental funds; (c) lack of adequate training for staff/instructors; (d) lack of time for staff to learn how to use the technology; (e) the need for additional staff; (f) lack of information about using computers; (g) lack of appropriate software; (h) resistance by instructors to using computers; and (i) belief that traditional methods of instruction are more effective. From the literature it is therefore clear that computer assisted instruction has significant potential, but it cannot fulfil all instructional requirements for all learners and all literacy providers.

Use of The Telephone for Instruction

Simpson (2002) noted that little recent research has been conducted on using the telephone for instruction, "Being an 'old' technology it does not attract the same

attention and input as new, more glamorous technologies involving computers" (p. 59). Simpson went on to say, however, that telephone support has proven advantages including (a) immediacy, (b) availability, and, (c) under certain circumstances, low cost. Telephone tutoring can also be used to provide a variety of types of distance instruction including: one-to-one, one-to-many at a single location using a speakerphone, and one-to-many at multiple locations using teleconferencing.

Robinson (1984) indicated that research into the effectiveness of telephone teaching generally indicates that learning can take place as effectively and, in some cases, more effectively in courses taught by telephone in comparison to courses taught by other means (p. 129). This statement was qualified by the note that tasks in which inter-personal relationships are important may be done less effectively by telephone. Robinson indicated, however, that learning depends more on how the medium is used, rather than the medium itself. Further, telephone tutoring can be used for a variety of tasks including: (a) to clarify student difficulties in course material; (b) to analyze a written text or score; (c) to check through worked answers to previously circulated problems; and (d) to manipulate symbolic expressions using previously circulated worksheets.

Perhaps the last major study to be completed on use of the telephone for instructional purposes was conducted by the Norwegian Centre for Distance Education. Rekkedal (1989) reported similar conclusions to Simpson, and, in addition, noted (a) that students who received calls from tutors felt that their tutors were interested in their studies; (b) that telephone calls were very encouraging; (c)

that telephone calls made it easier for students to cope with difficulties; (d) that telephone tutoring decreased the sense of isolation experienced by some distance education students; (d) that telephone tutoring did not significantly increase the burden on instructors; and (e) that telephone conversations stimulated tutors and, "probably helped them doing a better job and made the rest of their distance education more interesting" (bold and underline by Rekkedal). Rekkedal recommend that the placement of calls be organized in advance to minimize the chance of missed calls.

One final advantage of the telephone over other technologies is that, because of its age, a significant body of instructional materials exist for it. Waterhouse, Mildenhall, and Sefton (1987) provide examples of resources that can be used to assist with literacy tutoring at a distance, and describe a variety of techniques that distant tutors can use.

Telephone tutoring has a number of limitations as well as advantages. These include: (a) it does not provide visual cues for both the person and his or her context (e.g., office, home, classroom); (b) it can take several calls to establish contact; and (c) it may involve out-of-office hours' work and, therefore, both students and tutors may be reluctant to initiate calls on the grounds of intrusion (Zucher, 1986; Simpson, 2002.). Olgren (1997) indicated that, to compensate for the lack of visual cues, visual information needs to be provided through supplementary materials such as printed documents, graphics, photographs, slides, videotapes, computer disks, or World Wide Web pages.

Robinson (1984) noted that the need for the tutor and learner to have identical learning materials (e.g., books, audio cassettes, video cassettes, and so on) can reduce instructional flexibility. Further, some exercises that can be done in a face-to-face situation are impossible using the telephone. Robinson (1984) indicated, this combination of factors shifted the didactic of the tutor/student relationship, placing the tutor or instructor more firmly in command of events (p. 131).

Use of the TDD for Instruction

Literature on the use of the TDD for instructional purposes is generally confined to lessons for deaf users on how to use these devices effectively. These materials have been produced by vendors as well as associations and agencies for the hearing impaired. While these materials cannot be applied directly to instructing literacy, they are nonetheless valuable resources. Wilson-Lum (1991), for example, provides useful guidance on TDD usage (e.g., write slowly; keep sentences short; get to the point quickly) that can be applied to the training of both tutors and learners in the operation of these devices. A videocassette that accompanies the instructional manual also provides easy-to-follow instructions on how to operate these devices and initiate, carry on, and complete conversations.

Even though TDDs have been widely used in the hearing impaired community for about 40 years, a review of the literature found no research on their use as instructional devices for the *hearing* population. Nor was there evidence of research on the use of TDDs for literacy instruction, even for the hearing impaired. Marshall, Nussbaum, and Waddy-Smith (1999) described using TDDs to improve literacy skills

of deaf children in a full-time program, but using TDDs was just one of a number of instructional strategies that they used concurrently. Further, correspondence with the Laurent Clerc National Deaf Education Center at Gallaudet University where Marshall et al. conducted their research indicated that use of TDDs as instructional devices has been reduced since the article was published. Instructors are using the devices less because deaf TDD users were found to be using abbreviations and shortcuts excessively in their writing. These shortcuts and abbreviations, while very useful in real communications, interfered with literacy instruction.

Summary

Literacy instruction in Canada is still largely conducted face-to-face, although technology is beginning to be used to supplement this traditional means of instruction. The two technologies that are most commonly used to support distance learners, the computer and telephone, each have powerful capabilities, but they also suffer from limitations. In particular, computers are relatively expensive to purchase and operate, require a variety of different support services, and impose an additional burden upon educators in terms of time and training. Telephones are more economical to own and operate, are readily available, and are simple to use, but do not support text-based dialogue. The TDD shares the flexibility of both technologies, some of the interactive features of the computer, and the economic and ease of use advantages of the telephone. This suggests that it may serve as a useful bridge between the two technologies.

Although the TDD is a proven communications technology, little research has been done on its use as an instructional vehicle. Further, research that has been

done has been restricted to the hearing impaired community and, generally, K-12 age children. On the other hand, a large body of tutoring materials exist for both the computer and the telephone that could be adapted for TDD applications. It is anticipated that because of the relative simplicity of the TDD compared to the computer, it may be less technologically intimidating than the computer to some learners. At the same time, however, common features of the two devices (i.e., keyboard, ability to chat, and visual presentation of information) should ease the transition from the TDD to the computer when this step becomes necessary. The TDD, therefore, appears to be a reasonable supplement to other technologies for literacy instruction and a useful bridge between telephone and face-to-face tutoring, as well as online instruction.

CHAPTER III

METHODOLOGY

Introduction

While the TDD is a relatively old communications technology, it has not been used extensively for instructional purposes except by the hearing impaired and those who work with them. This research project was aimed at establishing the validity of using the technology for an entirely new purpose - supporting adult literacy distance learning in the hearing community.

The methodology used to conduct this study evolved throughout its course. Initially, a multiple-case study was planned. This plan when implemented, however, failed to generate the required results and had to be modified. While case study methodology continued to be used in the subsequent iteration of the study, this methodology was incorporated within an overall action research framework.

Application of this new model subsequently produced useful results.

This chapter explains why case study methodology was initially selected for the study and describes the initial research plan. It goes on to explain why this plan failed and how it was subsequently modified. In so doing, it also explains why an action research model was adopted as an overarching framework. The chapter concludes by discussing how data were analyzed, interpreted and triangulated.

Development of the Initial Research Plan

Experimental Method. An experimental research strategy generally is appropriate when the intent is to control behavioural events (Yin, 1994). Given that the focus of this study was evaluating the effect of a particular intervention (use of

the TDD), an experimental research design was appropriate. Conduct of a *true* experiment (Huck & Cormier, 1996) was assessed to be impossible, however, because of difficulty in randomly selecting participants, isolating the variable (use of the TDD), and achieving independence of observation. Moreover, because the validity of using the TDD as an instructional technology had yet to be validated, a valid quantitative study was virtually impossible. In order to establish the conditions necessary for future research, it was therefore decided to conduct a qualitative study.

Unlike quantitative research, qualitative research does not attempt to manipulate variables under tightly controlled conditions but rather researches topics "in all their complexity", seeking to understand behaviour from the participants' perspective (Bogdan & Bilken,1998, p. 2). Qualitative research is naturalistic, relies upon descriptive data, is concerned with process, is reliant upon inductive reasoning, and is concerned with meaning.

Case study is one qualitative research methodology that can be used to address questions and issues of an experimental nature (Johnsen & Christenson, 2000). Case study methodology is particularly useful when the research questions seek explanations – the hows and whys of events" (Yin, 1994) and is well suited to "explore processes, activities, and events" (Creswell, 2003, p. 183).

One of the advantages of case study methodology over other qualitative approaches is that it is very flexible and can be adapted to a wide variety of situations. Case studies can be used to (a) explain the presumed casual links in real-life interventions; (b) describe interventions and their context; (c) illustrate topics

within an evaluation; (d) explore situations in which the intervention has no clear, single set of outcomes; and (e) may be conducted as a meta-evaluation (Yin, 1994, p. 15).

Types of Case Studies. Case studies can be differentiated on the basis of whether they deal with single or multiple cases, and whether they have *holistic* or *embedded* designs (Yin, 1994, pp. 42-43). Holistic designs examine one or more cases within a single context, while embedded designs examine cases with reference to their individualized context. A holistic design is advantageous when no logical sub-units can be defined, or when the theory underlying the case is of a holistic nature. Weaknesses of this design include: (a) it is always possible to question the generalizability of findings; and (b) it is vulnerable to changes in conditions.

Embedded designs are not only less vulnerable to changes in conditions; they actually invite them because they can serve as a means of focusing the inquiry. The associated risk, however, is that the embedded inquiry may not return to the larger unit of analysis, resulting in multiple independent inquiries, not a single unified study. As Yin (1994) indicates, "the original phenomenon of interest (a program or organizational climate) has become the context and not the focus of study" (p. 45). This risk can be minimized by clearly defining the *case* at the outset.

A single case design is useful when the case represents a critical test of existing theory, a rare or unique circumstance, a representative or typical case, or when the case serves a revelatory or longitudinal purpose (Yin,1994, pp. 45-46). On the other hand, multi-case studies, also known as collective case studies (Johnsen &

Christenson, 2000), are preferable if there is any intent to generalize or compare and contrast results (Bogdan & Bilken, 1998, p. 63). Because the underlying logic of multiple case studies is the same as multiple experiments - replication, multiple case studies can be more compelling than single case studies (Yin, 1994; Slake, 1995).

Preliminary Design Conclusions. Given the lack of prior research on the use of TDDs for educational purposes, it was evident that a qualitative study was preferable to a quantitative study. A case study design was subsequently selected because this form of qualitative research is widely accepted, and it is inherently flexible. Flexibility was important because of the preliminary nature of the inquiry. A multi-case study design was eventually adopted because this design has the potential of generating findings that could serve as the basis for future research.

Based upon the preliminary analysis, the multi-case design described by Yin (1994) was adopted as the general research model (see Figure 2). This design has eight steps: (a) development of theory, (b) design of a data collection protocol, (c) selection of cases, (d) conduct of case studies, (e) writing of individual case reports, (f) drawing of cross case conclusions, (g) modification of the theory, and (h) writing of the cross-case report (pp. 49 – 51). An important feature of this design is that it incorporates a feedback loop that allows the researcher to focus the inquiry and study different aspects of the theory. When it was eventually determined that the research method had to be modified, this feature proved to be very important.

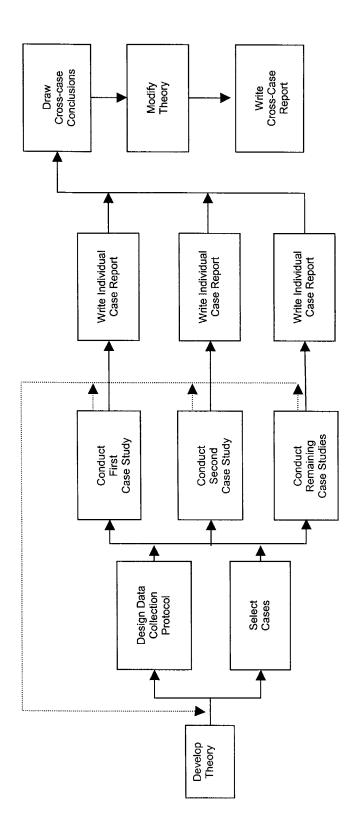


Figure 2. Case study method for a multi-case study incorporating a feedback loop for adjustment of participant selection criteria. Adapted from Yin (1994).

Case Selection

Overview. The Barrie Literacy Council (BLC) was founded in Barrie, Ontario in 1978 with the purpose of helping adult residents of the Barrie community to improve their basic reading, writing, and math skills; using these skills in everyday living; reaching their own goals; and improving their self-esteem (BLC, 2005a). In addition to providing instruction to adults who wish to improve their basic literacy and mathematics skills, the Council also instructs its own tutors.

The BLC is affiliated with LLC, which is in turn affiliated with Laubach Literacy International (LLI). Although LLI is still the source of the majority of the Council's instructional materials, increasingly the Council is using other print-based and electronic media. The Council receives the majority of its funding from the Ontario Ministry of Training, Colleges, and Universities, but also conducts a variety of fundraising activities.

Council Structure. The BLC is hierarchically organized and consists of a chair, a vice-chair, a board of directors, a small paid staff, and a large number of volunteer tutors and committee members. The paid staff is made up of (a) a program coordinator; (b) an administrative assistant who manages the Council's office on a day to day basis; (c) an assessor who evaluates the needs of students; and (d) a student/tutor co-coordinator who matches students with tutors, periodically reviews student progress with tutors, and performs a variety of pedagogical functions. The amount of time that staff members can be employed is constrained by the Council's budget, consequently, most staff members work only part-time. A full-time special

needs teacher, whose position is funded by a local public school board, is also employed at the Council, but works only with special needs students.

One hundred and forty volunteers were registered with the Council in 2004/2005, providing over 7,800 hours of support. Approximately 55% of volunteer service was devoted to tutoring, while the remainder of volunteer time was devoted to a variety of other activities including performing managerial functions, conducting public affairs activities, and fundraising (BLC, 2005b).

Student Body. At the time of the study, 129 students were enrolled with the BLC. Of these students, 51% were male and 49% were female (BLC, 2005c). Students ranged in age from 18 to over 65 years of age, with 54% of students falling in the 25 to 44 years of age range (see Table 1). Thirty-six percent of students were at Level 1 (lack basic literacy skills); 50% were at Level 2 (lack functional literacy skills); and the remainder were at higher levels (see Table 2).

Table 1

BLC Student Demographic Profile by Age Group

Age Group	Enrolment Rate
16 – 24 years	.15
25 – 44 years	.54
45 – 64 years	.27
65+ years	.03

Notes. Statistics cover the period April 1 to July 31, 2005. n = 129 (BLC, 2005c).

Table 2

BLC Student Demographic Profile by Literacy Level

Literacy Level	Enrolment Rate
Level 1	.36
Level 2	.50
Level 3	.13
Level 4	.01
Level 5	.00

Notes. Statistics cover the period April 1 to July 31 2005. n = 129 (BLC, 2005c).

Approximately 85% of BLC students reside within the City of Barrie, while the remainder live in surrounding communities (BLC, 2003). While it is known that the reasons for students seeking literacy support are often complex and interrelated, BLC students *indicated* that they had sought literacy support for the following reasons: for employment reasons – 36%; to allow them to continue with training or education – 18%; and to further their independence – 46% (BLC, 2005b).

Instructional Philosophy. The BLC's instructional philosophy is based upon the philosophy of LLC, which is in turn based upon that of LLI. The goal of Frank C. Laubach, LLI's founder, was not simply to improve literacy skills, but to enable individuals, communities, and nations to transform themselves and their societies (Laubach, 1990). This essentially progressive philosophy is tempered by a strong humanistic element. Humanistic organizations are concerned with the freedom and integrity of individuals controlling their own lives and learning (Scott, 1998). These

dual philosophies, progressivism and humanism, are evident in the *organizational* beliefs of LLI: (a) each learner is a unique individual; (b) tutoring is effective; (c) reading and writing are meaning-based processes; and (d) a variety of instructional approaches are needed (Laubach Literacy Action, 1994). These values are reflected in the BLC's purpose statement, "We are here to help adults in our community to improve their basic reading, writing and math skills, to use these skills in everyday living, to reach their own goals, and to improve their self-esteem" (BLC, 2005a, ¶ 2).

Operating Framework. The BLC has developed its own, unique operating framework based upon the integration of its organizational structure and its philosophy. This operating framework is illustrated in Figure 3. At the centre of the figure are students and tutors, the *raison d'etre* of the Council. Surrounding the students and tutors are the full-time staff members, who create the conditions necessary for learning to take place. Surrounding the full-time staff are the various support structures of the Council, which enable the staff members to perform their functions and support the students and tutors. Overseeing the support structures is the Council executive, which provides strategic guidance and liaison with external agencies. In essence, the Council conceptualizes itself as the antithesis of a hierarchical organization; it views itself as a support structure for students and their tutors.

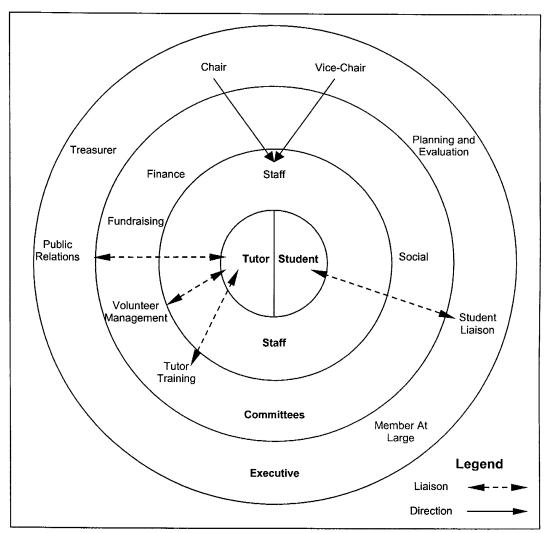


Figure 3. The BLC Operating Framework.

Note: All Council members are focussed upon supporting the tutor/student learning relationship. (BLC, 2004). Used with permission.

<u>Pedagogical Approach</u>. The BLC uses the *Laubach Way to Reading* as the basis of its instructional program. This series of lessons, which was developed by LLI, provides a systematic development of basic reading and writing skills, and includes vocabulary development, phonic and structural analysis of words, reading of stories, comprehension checks, and writing practices. The program uses skill

books and correlated readers provided by LLI, as well as reading materials selected jointly by the tutor and student (Laubach, Kirk & Laubach, 1981).

While the *Laubach Way to Reading* allows for variety of instructional techniques (e.g., individualized instruction, small group instruction, and larger group activities), the BLC has indicated a preference for individualized instruction. This preference manifests itself in the Council's mission statement, "In keeping a student-centered approach, we offer flexible scheduling for our one-to-one (tutor/student) instruction" (BLC, 2005a, ¶ 3). The Council has been successful with this approach and in 2004/2005 was able to match 85% of students that required and desired a tutor with one (BLC, 2005b).

The Literacy Council's preference for individualized instruction is tempered by pragmatic concerns, and it is prepared to use other instructional methods when these methods meet the needs of students. These approaches include group instruction, group supported activities, and computer assisted learning. Although the Council does not have a distance learning program, anecdotal evidence indicates that individual tutors have occasionally used telephone tutoring with some students. The absence of distance learning practices is not surprising since until very recently the Council has been focussed entirely upon servicing its local community, "Our dream is to increase adult literacy in our community, one student at a time, and enable individuals to reach their full potential" (BLC, 2005a). This local focus militates against the introduction of distance learning practices.

Learning Centre. The BLC Learning Centre (see Figure 4) is located a few blocks from downtown Barrie in a former factory that has been converted for mixed

use. The BLC shares this very large building with a variety of other users including a security firm, insurance and investment companies, a childcare facility, and a number of charitable and public service organizations. Due to the Literacy Council's growth in recent years, the Learning Centre just barely meets its space requirements.

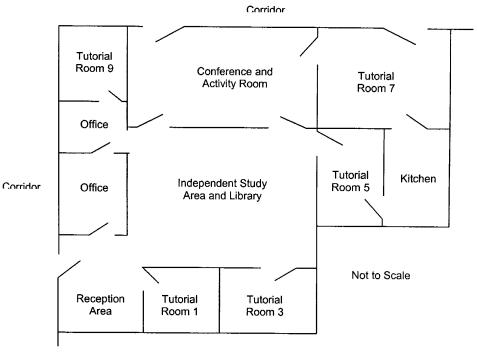


Figure 4. The BLC Learning Centre.

Note: The Learning Centre is organized to support the three types of instruction provided by the Council. Individualized instruction takes place in tutorial rooms; group activities are conducted in the conference/activity room; and independent study activities are conducted in the independent study area and library. A classroom for special needs students is nearby but not illustrated.

Reasons for Selection. The BLC was selected for the study for several reasons. Slake (1995) indicates that when selecting a case, "The first criterion should be to maximize what we can learn" (p. 4). The BLC met this criterion in that it served both rural and urban clients, it was geographically convenient, and it had a

significant number of students. Furthermore, because the researcher had tutored at the Council for almost two years prior to the study, he had established relationships with many staff members, tutors, and students. Given the relatively short duration of the study, it was felt that this close relationship with the Literacy Council would be a significant advantage.

Equipment Selection

Each participant in the study was to be provided with his or her own personal TDD for the duration of the study. The Ultratec Inc. Miniprint 425 (see Figure 1) was chosen for the study because it is typical of TDD models currently available and in widespread use in Canada. This model incorporates a number of features including:

(a) a QWERTY keyboard; (b) a 20 character LCD display; (c) a built-in printer; (d)

Go Ahead (GA) and Stop Keying (SK) speed keys; (e) a built-in ring flasher; (f) direct connect capability to standard analog telephone lines; and (g) an integral text answering machine.

Of note, because of the intent of the study, to provide an alternative, economical means of providing distance learning literacy support, a conscious decision was made to use a basic as opposed to higher priced, full-featured TDD. In particular, it was decided to use a device that uses the older ITA2 code not the newer, more versatile ASCII. While ASCII devices are much more capable than ITA2 code models, they are still relatively rare in Canada, and they cost approximately 10% more than a comparable ITA2 model.

Initial Participant Recruitment Plan

Primary participants in the initial research plan were to be pairs of tutors and students recruited from within the BLC who would use TDDs in their tutoring and studies. Participants were to be recruited using a combination of posters, E-mail solicitations, briefings, and direct approaches. Literacy Council files were to be used to assist in the selection of participants from the list of volunteers. The intent of this file review was to achieve participant diversity in terms of age, gender, residency (rural or urban), and literacy level.

Secondary participants were to consist of those individuals who participated in the inquiry, but who did not actually use TDDs for instructional or study purposes. Secondary participants would include Council officials, family members of primary participants, other tutor and students who were affected by the study, and so on. Although secondary participants were not to be targeted for data collection, if they proffered information it would be collected. Further, if the inquiry was observed to have an impact on these individuals, this too would be recorded.

Initial Participant Training Plan

Study participants were to receive two types of instruction. All participants initially would be taught how to install and operate a TDD. To the extent possible, skilled volunteers from local agencies for the hearing impaired were to provide this instruction. Furthermore, off-the-shelf training materials were to be used to minimize costs. This instruction would be followed by a brief evaluation exercise to confirm that the participants could hook-up the equipment, establish communications, and carry on conversations on their own.

Once initial technical training had been completed, tutors were to receive additional instruction on how to use the telephone and TDD to support learning. This training would focus on adapting familiar lessons in the *Laubach Way to Reading* for use at a distance. Once this training had been completed, the study participants would progress to using the TDDs in their tutorial sessions. It was initially anticipated that tutor/student pairs would use the devices for from six to eight weeks. Of note, the initial research plan included only one-to-one tutorial activities; small group activities were not planned.

Ethics Review

Prior to the study being conducted, the research plan was reviewed and approved by Athabasca University's Research Ethics Board. The research plan contained the following measures to ensure that the study was conducted in accordance with appropriate ethical standards:

- Prior to the study, the Board of Directors of the Literacy Council was briefed on the research plan. A copy of the plan was also posted on the Literacy Council's notice board for all Literacy Council members to review.
- Individuals were briefed on the plan prior to being asked to consent to
 participate. Due to the limited reading ability of some potential participants,
 the signature of student participants had to be witnessed by an individual who
 could attest that he or she had discussed the contents of the consent form
 with the student, and the student understood it.
- Participants were provided with the names of individuals whom they could consult if they had any concerns. One individual was a member of the

Literacy Council's board of directors; the other was the researcher's supervisor at Athabasca University. A toll-free telephone number was provided for the latter individual.

- Measures were instituted to protect the anonymity of participants, including using pseudonyms in research documents.
- Measures were taken to safeguard all study materials.
- Measures were taken to ensure that both the Literacy Council and individual
 participants were informed of the results of the study. These measures
 included providing a briefing to the Literacy Council Board of Directors, and
 providing the Literacy Council with a copy of the study report.

The *Participant Consent Form*, which contains a summary of measures taken to safeguard participants, is included as Appendix A.

Response to the Initial Research Plan

The initial research plan received a mixed reception. Generally it was well received by staff and tutors as evidenced by favourable E-mail messages and comments from the staff and tutors. On the other hand, it was not well subscribed to. Only one tutor/student pair actually volunteered to participate in the study and completed the prescribed instruction. A second pair volunteered, but could not participate because of scheduling conflicts with the tutor. Several tutors indicated an interest in participating, but later advised that their students were unwilling to do so.

Following this setback, discussions were held with Literacy Council members to determine why more tutors had not volunteered to participate in the study. These discussions concluded that, in general, tutors thought that using TDDs for distance

tutoring was a good idea, but this instructional methodology was not appropriate for them personally and their students. A variety of reasons were advanced for this apparent dichotomy:

- 1. Most BLC tutors had not previously done any distance tutoring.
- 2. Some tutors were uncomfortable using technology.
- 3. Few tutors had any knowledge of TDDs.
- Few tutors could conceive how to use this technology in their tutoring practices.
- 5. Existing tutor/student pairs had established study methods and routines and were comfortable with these. It was perceived that the interjection of distance into these tutoring relationships could have harmful effects.

Interestingly, two students also indicated that they were reluctant to participate because they believed that asking them to use TDDs was a conscious attempt to distance them from their tutors. Even after repeated reassurances from the Literacy Council staff and the researcher, this concern persisted.

The upshot was that too much had been attempted too quickly with a group of tutors and students that was slow to accept change. As a result of this analysis, it was determined that the research plan had to be modified.

Revision of the Research Plan

Goal of the Revision. The goal of the revision was to increase the participation of Council members in the study by addressing to the extent possible the deficiencies in the initial plan. Several prerequisites to success were identified:

- Potential study participants had to be familiarized with and made comfortable with the technology before they were recruited.
- 2. The ability of the technology to support learning had to be demonstrated.
- Not just instructional concepts but actual instructional materials had to be made available to tutors.
- Distance learning had to be portrayed not as a competitor of, but adjunct to face-to-face tutoring.

Because active involvement of Council members in the study was identified as an essential prerequisite for success, it was decided that an overarching action research framework would be applied to the study.

Action Research. While adoption of an action research framework was a departure from the initial research design, this departure was not as significant as it first might appear. As previously indicated, the initial design had incorporated a loop-back mechanism that allowed the original theory to be revisited and, if necessary, revised. Adoption of the action research model took this one step further and integrated review in a continuous process.

While case study can be considered a methodology in itself, it also can be considered as a means of conducting action research. Cousin (2000) indicates:

What is needed to lift a case study into an action-research field is the presentation of evidence in relation to a clear research question upon which public inquiry can feed. Because all action-research centres on a change intervention as a proposed solution, it is important to locate the research

question in this intervention and to be open to testing it fully by gathering rich data. (Case Study or Action Research? section, \P 2).

Action research is based upon a cyclical process and can house a range of research methods, both qualitative and quantitative (Cousin, 2000). Various authors have identified various steps in the action research cycle. Cousin identified three steps (planning, acting and reflecting), while Susman and Evered (1978) listed five (diagnosing, action planning, action taking, evaluating, and specifying learning). Dick (1999) describes action research is an *emergent* methodology wherein method, data, interpretation, and action develop simultaneously, from cycle to cycle. Although different authors identify different steps in the action research cycle, all agree that the active involvement of participants is essential.

As will be discussed in subsequent sections, adoption of the action research model manifested itself in many different ways. Several examples include:

- Study participants influenced the type of learning activities to which the technology was applied. The guide that the author drafted for the use of tutors was continuously adjusted based upon the comments of participants.
- The envisionment of how the technology could be applied in relation to
 other technologies was adjusted based upon the experience of
 participants with the device. For example, while it was originally
 envisaged that TDD users would transition and become computer
 users, this did not exactly prove to be the case. As will be discussed in

- Chapters 4 and 5, the envisionment of not only how the TDD could be employed, but the computer as well, was adjusted.
- Initially, a very rudimentary process was advocated for introducing the
 device into instruction (technical training followed by application of the
 technology using modified face-to-face instructional techniques). A
 much more detailed process was developed based upon experience
 gained with participants.

The upshot is that application of the action research framework allowed the study participants to change the envisionment of how the technology could be applied, the types of activities that it could be used for, and the process by which it should be introduced.

Analysis of BLC Membership. The recruitment of participants for the revised study was influenced by an analysis of the BLC membership that was conducted following the failure of the initial research plan. When the initial recruitment plan had been developed, it had been assumed that tutors and students were two, essentially homogeneous groups. The review identified that this was not the case, and that were at least three distinct types of tutors, and four types of students. Figure 5 illustrates the tutor sub-system and Figure 6 illustrates the student sub-system.

<u>Tutors</u>. While all new tutors receive the same basic training, tutors actually provide three distinctive types of service. *Floating Tutors* support independent learners; *Activity Leaders* conduct specific activities; and *Matched Tutors* assist individually assigned students. Some tutors perform several functions, while staff members perform other functions in addition to their tutorial duties.

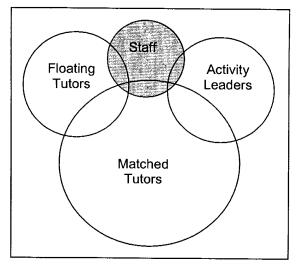


Figure 5. The tutor sub-system.

The three types of tutors carry out their duties and interact somewhat differently. A matched tutor instructs only a single student and, consequently, adapts his or her instructional style to meet the specific needs of that student. Because of the individualized nature of instruction, and because matched tutors meet with their students at various mutually agreed upon times and locations, matched tutors may have only limited contact with each other and with other Literacy Council members.

Floating tutors work in small group settings and are assigned to support special needs students and independent students. Both groups of students are instructed at the Learning Centre. Unlike matched tutors, floating tutors do not have specifically assigned students, but provide support to learners on an as-required basis. Floating tutors must be adaptive in order to meet the diverse needs of these students. Generally, floating tutors have the opportunity to meet and interact with more tutors than matched tutors. Not only do they routinely meet with other floating tutors, they also meet matched tutors who visit the learning centre to exchange study materials, and use tutorial rooms.

An activity leader is assigned a group of students for a specific activity such as a book club, writing group, mathematics group, life skills group, or other similar activity. Students assigned to an activity leader may be either matched students, who also have individually assigned tutors, or independent students, who are supported only by the learning centre staff and floating tutors. Activity leaders, like floating tutors, have a significant amount of interaction with staff members and other tutors.

During the initial iteration of the study, matched tutors were targeted for recruitment because they made up the majority of tutors, and they provided instruction in the manner preferred by the Council (one-on-one). The analysis indicated that the difficulty with recruiting matched tutors was that they were reluctant to participate in the study because they had already adopted instructional styles, and they had established instructional routines with their students. Floating tutors and activity leaders, even though fewer in number, were identified as potentially greater sources of volunteers because of their more adaptive instructional approaches, and because they were not committed to specific students.

Students. Students can be categorized by the type of support that they receive. *Matched students* receive individualized instruction; independent students receive group instruction; and special-needs students receive specialized instruction in a classroom setting. *Autonomous Students* utilize Council resources, such as computers and the library, but do not receive tutorial assistance per se. As illustrated in Figure 6, some students participate in a variety of different learning activities.

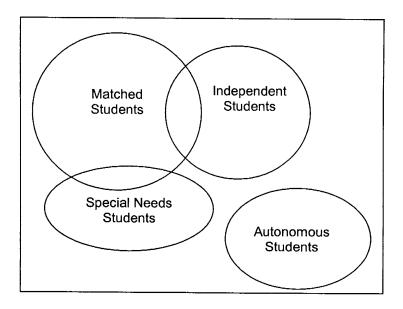


Figure 6. The student sub-system.

Demographically, independent students are similar to matched students. When an individual approaches the Council seeking assistance, he or she normally becomes an independent student pending being matched with a tutor. Both independent students and matched students are therefore drawn from the same population. This having been said, the two groups are not absolutely identical. Some independent students drop out before being matched with a tutor; some students continue to participate in independent studies even after they are matched; and some students choose not to receive individual instruction, but remain as independent students. Because the two groups are so similar, findings applicable to one group should be applicable to the other as well.

Similarly to the analysis of the tutor population, the analysis of the student population revealed that an inappropriate group might have been targeted for recruitment in the initial research plan. In discussions with the Council's staff, it was

concluded that matched students were least likely to be receptive to change because they had already established routines with their tutors. On the other hand, independent students were more likely to be accepting of change because they had not yet established fixed study routines. Further, independent students were more likely to volunteer to participate in the study because, generally, they were more active participants in the Literacy Council community by virtue of their participation in daily and weakly group activities.

Revised Research Plan

Overview. As a result of the application of the action research framework to the case study methodology and the re-evaluation of the potential participant populations, the research methodology was revised substantially:

- Focus of the research was adjusted from use of TDDs at a distance to use of
 the devices as an adjunct to face-to-face instruction. It was felt that if this
 phase of the study was successful, the study could then be expanded to
 incorporate distance tutoring.
- The target group of students was adjusted from matched students to independent students.
- The target group of tutors was adjusted from matched tutors to floating tutors and activity leaders.

The recruitment effort was also expanded from just tutors to include both tutors and students. Initially only tutors had been recruited directly on the assumption that they would then recruit their students. The revised approach targeted students who had not yet had tutors assigned.

Distance Tutoring Simulation Suite. One of the problems that had been identified with the initial research plan was that Literacy Council members were reluctant to volunteer to use a technology that they were not familiar with. In order to give the project greater visibility and allow potential participants to become familiar with the technology in a non-threatening environment, a tutorial room at the Council was equipped with a distance tutoring simulation suite (see Figure 7).

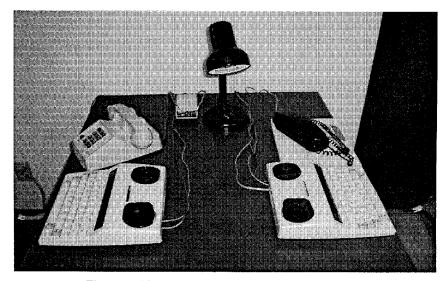


Figure 7. The distance tutoring simulation suite.

Note. The simulation suite was located in Room 7 at the BLC Learning Centre.

The simulation suite consisted of the following:

- 1. Two telephones a standard Nortel Model 2500 (to the left in Figure 7) and a buttons-in-handset, General Electric Model 9126-B (to the right in Figure 7).
- 2. Two Ultratec Miniprint 425 TDDs.
- A Viking DLE-200B telephone line simulator device (TLSD)(see Figure 8).
 This device allowed telephones and TDDs to function without having to connect to the telephone system.

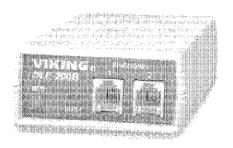


Figure 8. Viking DLE-200B TLSD.

Note: Two or more telephones or TDDs can be linked together using such a device. Copyright 2002 by Viking Electronics, Inc. Used with permission.

4. An easy-to-read instruction sheet (See Appendix B). This sheet explained how to turn the equipment on and off and initiate communications.

Distance Tutoring Handbook. To address the pedagogical needs of tutors, a handbook was prepared to provide guidance on how to use technology in distance tutoring (see Appendix C). This handbook expanded upon accepted adult literacy practices (Cameron & Rabinowitz, 1988; Harwood, 2001; LLC, 2003) and provided sample adult literacy distance tutoring exercises, complete with instructional tips. The handbook also discussed how to transition from face-to-face to distance tutoring. To provide program consistency, exercises in the handbook were based upon Laubach Way to Reading materials that are used in face-to-face lessons. Three types of activities were presented: (a) voice-only (telephone tutoring) activities, (b) text-only (TDD tutoring) activities; and (c) voice and text (VCO tutoring) activities.

Participants

Overview. The various changes in approach resulted in a significant increase in participant recruitment. In total, 21 participants including five staff members, seven

tutors, and nine students were recruited and completed initial training. The total number of individuals who actually trialed the TDD suite was actually higher than this as some users experimented with the devices when the researcher was not present. These users are known to have existed based on staff reports and artefacts such as TDD printer tapes that they left behind. In addition to these documented and non-documented participants, a special needs class consisting of one teacher and eight students used the suite for familiarization purposes for several hours.

Staff Members. All five of the staff members who participated in the study were females.² Their ages varied between approximately 30 and 55 years of age. All of the staff members were highly experienced tutors. One of the staff members was a founding member of the Council.

Tutors. Two male and five female tutors participated in the study. While the Council has approximately equal numbers of male and female tutors, the disproportionate number of female participants reflects the fact that most of the research was conducted during the day. Most daytime tutors are women, while many evening tutors are men. Ages of the tutors varied from approximately 30 to approximately 50 years of age. Experience levels varied from no experience (one tutor became qualified while the study was ongoing), to several years. Of note, the Council replaces approximately one third of its tutors each year.

Students. Three male and six female students participated in the study. Ages varied from approximately 19 to 55 years of age. Of note, three students were in the 16 to 24 years of age demographic group, two students were in the 25 to 44 years of

-

² Note. All of the Council's staff members are female.

age demographic group, and four students were in the 45 to 64 years of age demographic group. This sample was not entirely representative of the Council because, overall, 54% of enrolled students are in the middle demographic group (see Table 1). The low participation rate by members of this group was probably due to the fact that the study was conducted during the daytime, when many of these individuals would have been working. Four of the students were at Level 1 (lack basic literacy skills) and five were at Level 2 (lack functional literacy skills). This mix of skill levels is representative of the Council (see Table 2). None of the students had developed keyboarding skills, although most had at least some familiarity with the QWERTY keyboard layout.

Participant Training

Most study participants underwent technical training prior to using the TDDs for learning activities. The intent of this technical training was to enable participants to be able to use the suite on their own. Some individuals received one-on-one instruction, while others received instruction in groups of up to four members. For circumstantial reasons, training sessions were always conducted for either students, or staff and tutors, but not both concurrently. The division of training along these lines was not intentional, but resulted from a variety of situational factors. For example, one session was scheduled following a tutor luncheon and thus contained only tutors as learners. Conversely, several sessions took place during independent study sessions when only students were available.

Learning Activities

Once participants had received initial operator training, they were able to begin to use the devices for learning purposes. Application of the technology developed in several discernable but overlapping phases as listed below:

- single student, face-to-face, learning activities;
- small group, face-to-face learning activities;
- large group, face-to-face learning activities; and
- activities in adjacent rooms.

Participants used the devices for a variety of activities, including the following:

- spelling exercises;
- group story writing;
- typed conversations;
- modification exercises (for example, converting adjectives to adverbs, singular nouns to plural forms, and so on);
- dictionary quizzes; and
- the game of 20 questions.

In accordance with the action research framework, instructional methods and materials were continuously adjusted throughout the study. For example, the decision to move from small group to large group activities was done at the request of several students. Similarly, the tutor handbook was repeatedly revised to incorporate changes and additions recommended by participants. Over the six weeks of the study, it was amended and expanded a total of nine times. Finally, at

the suggestion of student participants, activities that did not require tutor involvement were introduced.

Data Collection Plan

The data collection plan (see Appendix D) mapped data collection instruments against specific data collection requirements, which were derived from the research questions. The data collection plan was developed for the multi-case study that was originally planned, but it remained valid even after the action research framework was applied because the research questions did not changed. As will be noted, however, one instrument was dropped and several new instruments were added to the plan because of the change in the research design.

<u>Data Collection Methods</u>. It was initially envisaged that the following data collection methods would be used:

- Documentary Reviews. Literacy council files on study participants were to be reviewed to gather biographical data and to identify their initial literacy levels and learning styles.
- 2. Interviews. Primary participants, both tutors and learners, were to be interviewed at various times during the study.
- Observation. Tutors and students were to be observed during briefings and while using the devices.
- 4. Tutor and Student Diaries. Tutors and students were to record their experiences in diaries. Students, because of their limited writing skills, were to be provided with checklists that they could use to record their thoughts.

All of these instruments except the student and tutor diaries were used in the revised research plan. After the action research framework was adopted, tutor and student diaries were found to be unnecessary because the researcher, who could gather the required information using one or more of the other instruments, attended all research activities.

In addition to the instruments planned for the initial study, the following new instruments were introduced when the research design was amended:

- Participant Questionnaire (See Appendix E). A one page questionnaire was developed and left with the TDD suite so that casual users could report upon their experiences using the suite.
- Artefact Retrieval. TDD printouts were collected for analysis. These were gathered following instructional sessions and during morning equipment checks. The morning checks yielded printouts from sessions that participants had conducted the previous evening.
- 3. Focus Group. After the trial was completed, a focus group was held with a convenience sample of three student participants. The researcher interviewed the group in Room 7 at the BLC's learning centre, where the majority of the research had been conducted. The Framework for Evaluating the Potential of Technology for Supporting Adult Literacy Instruction developed by Anderson (1991)(see Appendix F) was used to guide the discussion. Members of the group were asked to comment on the ease with which the TDD could be used, and it's ability to meet expectations, meet needs, provide feedback, maintain interest, and support learning. Student

comments were transcribed by the researcher, and then analyzed using categorical aggregation techniques.

Nature of Data Collected. Data collection requirements were derived from the research questions. Data of the following types were collected: (a) attitudes of tutors and learners to the use of technology; (b) the literacy learning goals of individual learners; (c) the comfort and confidence of tutors and learners with using technology for learning purposes; (d) the prior knowledge of tutors and students with technology in general and TDDs in particular; (e) how easily tutors and students were able to learn to properly install and operate TDDs; (f) how tutors and learners used the TDDs to support learning; (g) impediments to effective use of the TDD; and (h) attitudes of tutors and tutors towards transitioning to computer based instruction at the end of the study.

Data Analysis and Interpretation. The accumulated data were analysed using a combination of categorical aggregation and direct interpretation techniques (Stake, 1995). Direct interpretation was used to analyse the impact of context and situational factors on learning, as well as the efficacy of specific interventions. Issues as diverse as the relationship between the physical layout of the BLC learning centre and learning outcomes, and the efficacy of particular learning activities with particular students under particular learning conditions were analysed and interpreted in this manner. Conversely, categorical aggregation techniques were used to analyse broader issues and phenomena including the attitudes of students and tutors towards the use of technology, the ability of students to master the use of TDD technology, and the ability of students to integrate the use of TDDs in their learning.

Categorical aggregation techniques were applied to research notes, interview materials, and artefacts.

The Framework for Evaluating the Potential of Technology for Supporting Adult Literacy Instruction developed by Anderson (1991) was used as a guide when conducting categorical aggregations (see Appendix F). Anderson rated the efficacy of adult literacy technologies on a scale of 1 to 7 for 25 criteria – seven criteria for administrators, twelve criteria for teachers, and six criteria for learners. Although Anderson's instrument was not applied directly, the categories that he used were used when analysing data.

Triangulation. Action research draws upon many sources of rigour, which are also found in other qualitative approaches. These include (a) use of multiple methodologies, (b) use of multiple sources of information, (c) use of multiple processes for data collection and analysis; and (d) comparing data and interpretations to those from other sources including the literature (Dick, 1999). Data can consist of personal reflections, lesson plans, students' work, student/parent/colleague interviews, and so on (Newman, 2000). Findings of the study were triangulated primarily through the use of such procedures. In addition, "member checking" (Stake, 1995, pp. 115 -116) was used to supplement triangulation procedures and validate the interpretation of some data.

Triangulation procedures that were used to improve the rigour of the study included the following:

 A variety of different types of participants were involved in the study including staff members, tutors, and students. Using both matched and

- independent students, as well as floating and matched tutors further enhanced this measure.
- Participants were grouped in several different ways for activities. For example, some activities were conducted initially with just instructor participants, then with only student participants, then with a combination of instructor and student participants.
- 3. A variety of different types of learning activities were trialed.
- 4. A variety of instructional approaches were used including individualized instruction, small group instruction, and large group instruction. Some participants were also self-taught, using only posted instructions and the distance tutoring handbook.
- A variety of data collection methods and analysis and interpretation techniques were employed.
- 6. Member checking was conducted at several points throughout the study.
 Early on, organizational information, findings and conclusions were
 presented to and reviewed by the BLC staff. Later, findings with respect to
 instruction were recapitulated to students and tutors and discussed.
 Finally, findings of the study were presented to a focus group of students,
 which discussed and further interpreted them.

Summary

Due to its inherent flexibility and focus on the *hows* and *whys* of events, a multi-case case study was initially selected for examining use of the TDDs for instructional purposes. This original research design did not adequately address the

situation within the BLC, particularly the strong influence of the tutor/student relationship on the use of technology. As a consequence, few tutors and students volunteered to participate in the study.

Following a detailed analysis of the Council, the research plan was revised. In the revised plan, the focus of the research shifted from matched to independent students, and from matched to floating tutors. The research vehicle was also adjusted from studying the use of the technology at a distance, to studying its capabilities in a simulated distance environment. Finally, in recognition of the key role that participants had to play in determining the course of the inquiry, the case study methodology was modified and embedded within an overall action research framework.

The revision of the research plan resulted in a significant increase in the number and type of study participants, enabling the conduct of a variety of individual and group learning activities. Through the use of a variety of data collection methods and the application of rigorous analysis and interpretive procedures, it was possible to obtain results to the research questions. These results are presented in Chapter 4.

CHAPTER IV

RESULTS AND DISCUSSION

Introduction

This study was intended to determine if the TDD could be used effectively as an instructional device for adult literacy instruction, and under what conditions. Initially conceived as a multi-case study of three tutor/student pairs, it evolved into an action research project that involved a larger and more diverse group of literacy council staff members, tutors, and students. The results of the study illustrate the potential of the technology to support distance learning, but also highlight where additional research and technical development are required. Further, they indicate that the organizational climate has a very significant effect on the overall effectiveness of the technology.

Organization of Chapter

This chapter reviews the results of the study in two stages. In the first stage, the five research questions that were introduced in Chapter 1 are reviewed and relevant results are presented. Answers to these research questions are necessary to determine if (a) the TDD can be used as an instructional technology, and (b) what, if any, additional research is warranted. This review of the research questions is followed by a discussion of the impact of the intervention on the BLC. This discussion is important because, while the BLC is a unique case, it is also representative of literacy councils across Canada. It is important, therefore, to understand not only the impact that introduction of the technology had on individuals, but also the effect that it had on the overall organization.

Is the TDD a technically viable instructional technology for adult literacy instruction?

Technical Performance. All equipment that was used in the study performed as anticipated. The only equipment failure that occurred during the eight weeks of the study resulted from a broken telephone jack, and this was quickly remedied by replacing a defective cord. From a purely technical perspective, therefore, the trial was an overwhelming success.

Notwithstanding that all equipment performed as anticipated, a number of deficiencies of a technological nature were identified with some items of equipment that were used in the study. These deficiencies were not equipment failures, but equipment *characteristics* that reduced the effectiveness of the technology as a vehicle for distance learning. The following limitations were identified with the equipment that was used:

- 1. VCO Capability. The TDD model that was used was optimized for typographic conversation. A standard telephone could be attached to enable verbal communications, but the audio quality was poor, and the listener had to pay attention very carefully to understand what was being said. This was tiring for the communicants and detracted from learning activities.
- Text Display. The TDD had only a 20-character text display. Consequently, only the shortest sentences could be displayed before text scrolled off the LCD. This limitation restricted certain learning activities such as analyzing sentence structure.
- 3. Complex Wiring. The standard equipment configuration (a telephone attached to a TDD) required multiple cords and lines, including: a TDD power cord, a

TDD to wall outlet cord, a telephone to TDD cord, and a handset to telephone cord. When a corded headset was used with the device, this added another two lines. This resulted in a confusing maze of wiring that easily became tangled.

- 4. Single Case Display. Because the TDDs used in the study communicated with each other using the old ITA2 code, messages could only be sent and received in upper or lower case, but not both. This limited activities such as spelling exercises.
- 5. Lack of Pre-composition Capability. The TDD model that was used did not allow for pre-composition of messages. Therefore, the tutor could not use it to prepare exercises in advance, and the student could not use it to complete homework assignments for later review. Similarly, the tutor could not save lessons for future use with other students, or share them with other tutors.
- 6. Printer. The TDD printer produced an adding-machine sized printout. While useful for a variety of purposes, these printouts could be difficult to read and did not look like standard printed documents. Students who wanted their work to look like "real" documents noted this latter shortcoming.
- 7. Group Discussion Capability. When two or more TDDs are connected together, what is typed on one machine appears simultaneously on all other connected devices. Because of this characteristic, confusion sometimes arose when three or more devices were connected together. For example, in one activity a tutor proffered a definition for a word with the intent that one of three connected students would respond by typing the correct word from a list

of possible alternatives. What occurred until a control procedure was put in place was that two or more students would begin typing simultaneously, leading to an indecipherable, hodgepodge of typed characters. This problem was resolved by: (a) students identifying that they were ready to respond by typing a pre-assigned number, and (b) the tutor indicating which student should respond. While this procedure worked, it was cumbersome and took time to learn.

The upshot is that while the equipment performed as intended, it was not ideal for the distance learning application for which it was employed.

Recommendations with respect to required technological improvements are presented in Chapter 5.

Ease of Use. A key consideration when considering technical viability is whether tutors and students can quickly learn to use the technology. Therefore, the ability of tutors and students to use the TDD after initial technical training was assessed.

In total, four tutors and eight students attended technical training sessions.

These sessions covered how to set up the equipment, establish communications, and carry on a conversation. These sessions were conducted with from one to three learners, all of whom were either instructors or students. This segregation of learners was not intentional, but occurred for circumstantial reasons. For example, two tutors were instructed following a training session on an unrelated topic, and a number of students were instructed when their regular instructor was called away to attend a conference.

During the training sessions, learners were provided with five to ten minutes of instruction by the researcher then allowed to experiment with the equipment for a further five to ten minutes. The instructor would then initiate a typographic conversation with each of the learners in turn. These conversations would be followed by an opportunity for learners to conduct conversations with each other. During these conversations, the instructor would introduce various TDD features and protocols.

By the end of the training sessions, virtually all learners were able to connect the equipment, initiate a call using either the telephone or TDD, and carry on a conversation with a tutor or student. Learners also had developed a basic understanding of the protocols governing use of the *Go Ahead* (GA) and *Stop Keying* (SK) speed keys that control the flow of conversation. The only individual who did not master basic operations during an initial training session was the student with the lowest overall literacy level. This student also experienced difficulties operating the device in subsequent lessons, even when assisted by a tutor or paired with another student.

Some learners did not attend training sessions, but learned to operate the device on their own by following the instruction sheet that was posted with it (see Appendix B). The total number of self-taught individuals is not known, but, from user reports and printer tapes that were later recovered, it was determined that at least three tutors and one student learned to operate the equipment this way. From an analysis of the printer tapes and reports, it is apparent that these self-taught learners had no difficulty learning to operate the machines. This having been noted, these

self-taught operators would have required additional instruction in communication protocols before they could have used the devices for learning purposes.

Both the categorical aggregation of the research documents and the student focus group confirmed that the TDD was easy to learn to use. Sixteen comments were recorded indicating that the TDD was *Simple to Use*, only one that it was *Moderately Difficult*, and only two that it was *Difficult*. One of the *Difficult* ratings related to the student who had problems operating the TDD throughout the study; the other arose from an incident in which a phone jack broke.

The focus group provided a similarly high rating. It rated *Ease of Use* as seven on a scale of one to seven, where one was *Difficult* and seven was *Simple*. The focus group further noted that students believed that they could learn to use the TDD with just the instruction sheet, and that student activities without any tutor or technical support were possible.

Is the TDD a useful learning vehicle for students?

Overview. Three criteria were used to assess whether the TDD was a useful learning vehicle for students: (a) student interest with the device; (b) the ability of the device to meet the individual needs of students; and (c) the ability of the device to support learning. In all cases, assessments were conducting using the rating guide provided by Anderson (1991) (see Appendix F).

Interest and Enthusiasm. In general, the TDDs were extremely well received by students. Of the eight independent students who used the devices in learning activities, six were either enthusiastic or very enthusiastic about their use. The two students who were less enthusiastic were the two students with the lowest overall

literacy levels. In their cases, the added complication imposed by the technology appeared to increase the frustration that they already had with reading and writing. Conversely, those students who appeared to enjoy using the machines the most were those individuals with the highest literacy levels. One of these students referred to the TDDs as, "the fun machines," while another described them as "extremely neat." Both of these individuals participated in multiple activities using the devices.

Nineteen indications of high interest were recorded in the categorical aggregation, compared to just two for moderate interest, and two for low interest. Perhaps the strongest indicators of high student interest were the recommendations received from students for new activities and new methods of employing the devices. For example, one student recommend using the devices for a game show type activity, while another recommended using them for student-only activities when a tutor was not available.

The focus group provided a similarly high assessment, rating *Interest* as seven on a scale of one to seven, where one was *Low* and seven was *High*. Focus group members explained this high rating by noting that they really enjoyed working with the technology, and that the device supported a wide variety of different activities. The group also indicated that they liked "figuring out new ways to use the thing."

Meeting Students' Needs. The ability of the device to meet the needs of students was assessed by examining the following: (a) whether the technology assisted in achieving overall learning objectives; (b) whether it provided an effective way to meet current learning needs; (c) whether it allowed a choice in the way

students learned; and (d) whether it complemented or conflicted with other methods of instruction. The categorical aggregation and focus group indicated that the TDD met the needs of students, but it also had a number of limitations.

The categorical aggregation identified 16 indications that the TDD *Met* the needs of students, three that it had a *Neutral or Mixed* impact, and 8 that it *Did Not Meet* the needs of students. Indications that the device met the needs of students included:

- TDD activities could be based upon any of the many different textbooks and workbooks available at the Council.
- 2. A TDD with a telephone could be used to support voice only, text only, and voice and text activities. This allowed activities to be tailored to meet the specific needs of individual learners.
- TDD activities could be designed to complement other types of instruction.
 For example, a small group activity was designed and conducted that complemented a Writing Club activity that had been organized by one of the activity leaders.
- TDDs could be used in both the face-to-face and distance tutoring environments.
- 5. Students could develop activities that met their specific needs. For example, one student designed the game of *Opposites*, wherein one student would type an adjective, and another would type its opposite.

Indications that the device did not always meet the needs of students included:

- The VCO capability of the machines was poor. This made voice and text activities difficult.
- 2. Sometimes students were left behind in group activities.
- TDD communications had to be conducted entirely in upper or lower case letters. This limited certain types of activities such as spelling and sentence revision exercises.
- 4. Text could not be scrolled back for review purposes. Printouts could be used for this purpose, but this was cumbersome.

Notwithstanding these limitations, the student focus group rated *Meeting*Needs as six on a scale of one to seven, where one was *Did Not Meet Needs* and seven was *Met Needs*. The students indicated that they awarded this relatively high rating because they thought the TDD could be used both as a supplement to face-to-face tutoring, and as a vehicle for distance learning. Group members also noted that the device allowed tutors to adjust the amount of support that they provided based upon the needs of individual students (e.g., the tutor could provide no prompts, typed prompts, oral prompts, or typed and oral prompts). The students indicated that use of the device had also demonstrated the challenges to be faced when communicating only in writing. They indicated that they had not previously appreciated all of these challenges.

Supporting Active Learning. The ability of the device to support active learning was assessed by examining the following: (a) whether the technology allowed students to interact with materials; (b) whether it allowed self-paced

learning; (c) whether it allowed the students to learn at times and locations convenient to them; and (d) whether it allowed for individual learning styles.

The ratings for *Supporting Active Learning* were mixed. The categorical aggregation identified 24 indications that the device encouraged *Active Learning*, 10 that it had a neutral or mixed impact, and 17 that it encouraged *Passive Learning*. Active learning indicators included:

- The device forced students to become actively engaged. Because the TDD
 did not have a memory or scroll back capability, students had to remain
 constantly engaged or the typographic conversation moved on without them.
- TDDs provided a more intuitive means of communication than handwritten communications. Like oral communications, TDD messages could be read as they were being composed. There was no delay between composition, transmission, and decoding.
- 3. The active involvement of two or more communicants increased interest and provided motivation.
 - Conversely, indications of passive learning included the following:
- Due to its compact size, it was awkward for two or more students to share a single device, even when the students were seated at the same table.
- Some participants were left behind in group activities because they could not keep up with the flow of conversation.
- One student could not use his TDD as planned because he was a long-range truck driver and could not afford to pay long distance telephone fees.

 Some students lacked the confidence needed to participate in group activities.

The focus group provided a less ambiguous endorsement of *Support of Active Learning*, rating it six on a scale of one to seven, where one was *Passive* and seven was *Active*. The group reported that the simplicity of the device, associated with its ease of use, enabled it to be used for a wide variety of activities. Focus group participants also indicated that they enjoyed using the device for both one-on-one and small group activities. They also reported that the combination of communications capabilities afforded by the telephone and TDD ensured that there was a suitable means of communication for virtually every learner.

Is the TDD a useful instructional vehicle for teachers and tutors?

Assessing the instructional potential of the TDD was difficult because of the short duration of the study, and the initially cautious approach of staff members and tutors to using the device in instruction. This having been said, staff members and tutors who used the TDD indicated that they thought that it had good instructional potential. Indications of instructional potential included the following:

- Two tutors independently reported that written dialogue exercises were better
 when conducted using the TDD than when using handwritten notes. This was
 because there was no delay between when messages were composed and
 when they were read.
- One staff member indicated that she was "amazed" at how fast students could begin writing stories using the TDD as compared to using the computer.

- After just the introductory 30 minute technical training session, several students were able to begin using the device to write stories.
- Four tutors indicated that they would like to employ the devices at a distance, even if only on a trial basis.
- 4. A representative of the Canadian Hearing Society expressed interest in using TDD activities in the Distance Tutoring Handbook (Appendix C) to assist deaf students to improve their literacy levels.

One tutor identified a less obvious way that the TDD could support learning. In adult literacy instruction, it is not unusual for a dependency to develop between a student and his or her tutor. The tutor suggested that distance tutoring could be used to help students transition from one-on-one to autonomous learning. With this view in mind, the tutor attempted to convince her student to participate in the study. The tutor was unsuccessful in this attempt, but, nonetheless, continued to believe that at some point distance tutoring could play a role in moving the student to autonomous learning. Using distance tutoring to assist in the transition to autonomous learning is a subject that merits further research.

What are the characteristics of tutors and students who can use TDDs most effectively?

Tutors. Because of the reorientation of the study from a case study to a case study within an action research framework, insufficient data were gathered to accurately assess what types of tutors were able to use TDDs most effectively. All seven tutors who were trained on the devices were able to operate them, but they had few opportunities to use them in tutoring. Further, because of the short duration

of the study, when tutors were able to employ the devices, they were able to do so only as an adjunct to face-to-face instruction. The study was not of sufficient duration to allow them to progress to true distance learning applications. Therefore, additional research on this question is required.

Students. More conclusive results were obtained for students because they could proceed immediately to participation in learning activities following receiving technical instruction. While most tutors were only able to use the devices several times, students were able to experiment with them on a regular basis over approximately six weeks.

As previously indicated, all but one of the students were able to successfully master technical operation of the TDD after just one lesson. Further, with each lesson completed, the confidence of students with the devices increased. Of note, lack of keyboarding skills did not appear to pose a significant challenge to any of the students. This may have been because (a) most of the students were at a similarly low keyboarding skill level, and (b) the composition speed of students was very slow due to their lack of basic literacy skills.

The one student who had difficulties with the TDD lacked both Level 1 literacy skills and self-confidence. This individual required constant coaching and encouragement and had difficulty using the device even when paired with another student. It is anticipated that this individual would have had extreme difficulty operating the device from home or another remote location.

While most students were able to learn to use the TDD very quickly, it was apparent that those with at least Level 1 skills were able to use it more effectively

and with greater ease than those who lacked these skills. Those lacking Level 1 skills also displayed a greater reluctance to participate in group activities including group activities with learners with comparable literacy skills. Given that all of the study activities were conducted in the same or adjacent rooms, and that technical and tutorial support were always immediately available, this could have significant implications. If students could not use the devices without difficulty under essentially ideal conditions, it is unlikely that they could have used them in actual distance learning situations.

The attitudes of students towards the use of technology appear to have had a significant impact upon how effectively they were able to use the technology. An experience with one student, who shall be referred to as John, illustrates this point. John, a Level 2 student, had been attending the Council four times a week for several months and had established a study routine that included independent study at the Council, participation in group activities, and homework. John easily completed training on the TDD and appeared to enjoy the experience. When asked to use the device for learning purposes, however, John expressed a reluctance to do so. In particular, he indicated that he did not want use of the device to interfere with his studies. This concern was subsequently discussed with the activity leader for whom John was preparing homework. The activity leader provided a copy of one of John's assignments, and agreed that John could use the TDD to complete it. A TDD learning activity was then developed specifically for John based upon this assignment. John still refused to use the device. Eventually it became clear that John viewed all use of technology in learning as a distraction from "real work".

John's reluctance to use the device for learning purposes did not appear to be based upon a technological aversion per se. Rather, it appears to have originated with how he defined *learning* and *success*. In his case, he defined these terms in terms of completing specific assignments, in a specific way, by a specific time and date. He considered anything that interfered with his learning plan to be a distraction that should be avoided. Therefore, how *learning* and *success* are defined by the individual student appears to be an important determinant of how willingly he or she will embrace use of the technology in instruction, and how successfully the technology can be employed.

Can TDDs assist learners to move to computer-based learning?

When the study commenced, it was thought that students would transition from face-to-face tutoring, to distance tutoring using telephones and TDDs, then distance tutoring and independent learning using computers. While this model may be valid for some users, particularly those students working at a true distance, technology use among study participants appeared to be more complex.

Purely by coincidence, the research project was paralleled by the introduction of basic computer classes at the BLC. These classes covered a number of subjects including: (a) how to start a Windows based computer; (b) how to set-up and use an E-mail account; (c) how to use a simple word processor such as Microsoft WordPad; (d) how to access AlphaRoute and other literacy instructional programs; and (e) how to search for information on the Internet. Four of the study participants partook in these classes.

From the comments of the students who participated in both the TDD study and the computer classes, it is apparent that they viewed the computer and the TDD very differently. These students generally depicted the computer as a *substitute* for a tutor (e.g., they could write with it, access information, complete lessons of various types, and so forth.). Conversely, they described the TDD as a device that was used with a tutor or another student. This distinction appears to have arisen from how they were able to use computers in their daily lives.

Only one of the student study participants regularly used a computer prior to the study, and only this student had a home computer. The other students could access computers at the Literacy Council and facilities such as public libraries, but, for a number variety of reasons, these facilities were not always accessible (e.g., hours of operation, remoteness, need for bus fare, and so forth). Therefore, while these students could use computers for many purposes, they could not use them to routinely communicate with their tutors because they did not have assured access.

The perception of the computer as a substitute for a tutor is understandable for another reason as well. Literacy Council staff members would sometimes assign computer-assisted learning activities to students who were waiting to be matched with tutors. After tutors were assigned to these students, they would normally replace these computer-assisted learning activities with one-to-one, face-to-face lessons. Thus, while computer-assisted instruction and one-to-one lessons should complement each other, this is not always the case. Sometimes, computer-assisted learning precedes individualized tutorial instruction. It is understandable, therefore,

why students might view the TDD as a device to extend tutoring, rather than as a lead-in to computer assisted learning.

In summary, use of the TDD did not serve as a lead-in to use of the computer. Rather, use of the TDD and use of the computer developed along parallel, sometimes concurrent courses. Computers tended to be used as a replacement for tutorial support, while TDDs were used to extend tutoring both in the classroom and at a distance. This dual approach is logical when viewed from the perspective of the students receiving instruction.

Impact on the BLC

Introduction. In retrospect, it is clear that, if the BLC was not a hostile environment for the introduction of a distance learning technology, neither was it an overly inviting one. This is not to say that members of the Council opposed or resisted the use of TDDs in instruction; this was not the case. However, conditions at the Council were such that the introduction of any learning technology faced significant hurdles. To a large extent, the research project entailed identifying and, when possible, overcoming these hurdles.

<u>Technological Climate</u>. By its nature, distance learning involves the use of one or more technical media (Keegan, 1999). Prior to the study, the only modern technology that was *routinely* used at the Council was the computer. Although televisions, VCRs, DVDs, and even a computer projector were available, these devices were rarely used for *instructional* purposes. Computer use by students was also limited.

During the final six months of 2004, just 27 percent of students (n = 170) logged 100 % of student computer use. Use of AlphaRoute, the Web-based software suite provided by the Ontario Ministry of Training, Colleges and Universities, was also low. When the study began, only ten students were registered in the program. ³

Students most frequently used computers to access educational programs. During the final six months of 2004, 58% of logged computer use was to access literacy and mathematics learning programs (see Table 3). This would be classified by Ginsberg (2001) as use of technology as a complement to instruction. A further 30% of computer use could be classified as technology as curriculum (e.g., word processing, E-mail, chat, and so forth). No use of technology as the delivery mechanism or technology as an instructional tool was recorded (see Chapter 2 for an explanation of these terms).

Of interest, of those students who did use computers, relatively few used them for the purpose of communications; only 18% of all uses were to access E-mail or the Internet. This indicates that the TDD was not only a new technological device for most students, it also represented a new technological concept – communicating typographically as opposed to orally or in writing.

97

Due to the efforts of one staff member, the number of students using the application increased to 27 by the time the study was completed.

Table 3

BLC Student Computer Usage Rates by Type of Use

Type of Use	Usage Rate
Literacy and Mathematics Instructional Programs	.59
E-mail and Internet Access	.18
Word Processing Activities	.12
Miscellaneous other Uses	.01
Unspecified Uses	.20

Notes. Usage rates reflect the number of accesses, not access times. Not all accesses may have been logged. n = 207.

Equipment Deficiencies. One of the most significant technological challenges faced by students was a shortage of modern machines. Of the six machines that students had access to at the time of the study, three were Pentium Is (approximately 10 years old), one was a Pentium II (approximately eight years old), and two were Pentium IIIs (approximately six years old). While the oldest of these machines could be used to access some literacy programs, their value was rapidly diminishing because they could not run the latest applications. Significantly, two of the machines could not access the Internet, without which they could not run AlphaRoute, the Literacy Council's preferred software application.

Equipment Accessibility. Computer accessibility was also an ongoing problem. Three computers were located in tutorial rooms, and three were in the Independent Study Area and Library. As previously noted, however, the Independent Study Area and Library was extremely busy and not conducive to learning. However, moving the computers to tutorial rooms would not necessarily have been a better

solution since these rooms were often fully utilized by tutors and students. The upshot is that because of competing demands for space, some computers were routinely unavailable for student use.

Tutor Training. The low use of technology by students can probably be partially attributed to deficiencies in tutor training. The LLC specification for basic tutor training prescribes only 10 minutes of instruction on use of computers during the 17 hour course, and makes no mention whatsoever of distance tutoring (LLC, 2003). Further, there is no mandatory requirement for tutors to participate in technological training after they have completed basic training. This situation is not unique to the BLC or LLC; other researchers have identified lack of technical training as a common characteristic of literacy agencies (Turner, 1993; Hopey et al., 1996; Jaffee, 2001).

During the study, the merits and limitations of distance tutoring were discussed with tutors whenever the opportunity arose. These discussions were usually conducted one-on-one, but a number of informal small group discussions also took place. In these discussions, several tutors indicated that they thought that distance learning might be useful for others, but that they did not see it being particularly pertinent to themselves or their students. In retrospect, this outlook was to be anticipated because the tutors and students involved in the study were drawn from the local community, and they already had functioning face-to-face, tutorial relationships. Both of these factors militated against the introduction of distance tutoring techniques.

Notwithstanding that they had indicated that they did not *currently* need a distance tutoring capability, some tutors acknowledged that distance tutoring could have merit under some circumstances. These tutors indicated that distance tutoring might be useful when the tutor or student had transportation difficulties; the tutor or student was infirm; or regular tutoring sessions had to be cancelled due to weather conditions. Of note, tutors were much more receptive to experimenting with the technology once they learned that the study's intent was not to change their tutorial practices, but to improve support to isolated learners, many of whom were not being served adequately by existing programs.

Impact on the BLC Learning Centre. As discussed in Chapter 3, the BLC Learning Centre was designed to support a variety of Council requirements. Tutorial rooms are used for individualized instruction, the evaluation of new students, and some computer assisted instruction. The conference/activity room is used for meetings, group learning activities, and the instruction of new tutors. This room is also used as a tutorial room when all other tutorial rooms are committed. The independent study area and library is extremely busy as it is used as a place for independent students to study on their own, tutors and students to access learning materials, and tutors and students to use computers. The room is also a transit way between the reception area and the other rooms of the centre and is used as a holding area for tutors and students waiting to use other facilities.

Activity levels at the Council vary by the time of day and the day of the week.

Evenings are busier than afternoons, and Mondays to Thursdays are busier than

Fridays. Monday to Thursday mornings are the peak period with all resources

frequently committed. Unfortunately, much of the study had to be conducted during this peak period because this was when independent students were available. This sometimes put the study in conflict with other learning centre users.

For the duration of the study, Tutorial Room 7 (see Figures 4 and 7) was configured as the distance learning simulation centre. This room was allocated for this purpose because it was the largest of the tutorial rooms and, consequently, could be used for activities involving up to four participants. On the other hand, Room 7 had to be accessed through the Activity and Conference Room, Tutorial Room 4 and the kitchen, or the outside corridor. Therefore, accessing Room 7 could disrupt users in these other rooms. Conversely, activities in the Activity and Conference room could sometimes be quite loud and disrupt activities in Room 7.

In addition to Room 7, the activity and conference room was also used for some study activities. These activities included both briefings and larger group activities using TDDs. One such activity was a *game-show*, which utilized four TDDs and involved one tutor and five students (see Figure 9).

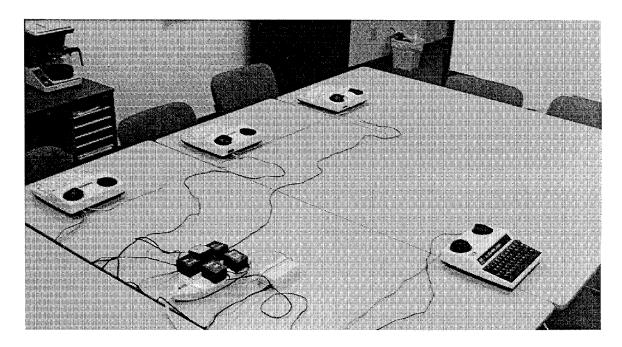


Figure 9. The activity and conference room configured for a game-show activity.

Throughout the study, Room 7 continued to be used for face-to-face tutoring when it was not being used for study purposes. Sharing the room was seldom a problem, although one study activity had to be postponed because the room was required for another purpose, and normal users of the room twice had to be moved to other rooms to make the TDD suite available for study activities. Room adjustments such as these are common occurrences at the Council.

One unanticipated benefit of sharing a room with face-to-face users was that casual contact with the study equipment during face-to-face lessons lead to some tutors and students experimenting with the suite. These experimentation periods demonstrated that even with only a set of printed instructions, tutors and students could setup and operate the equipment.

Use of the two rooms at the Council demonstrated the following:

- Any room with a standard electrical outlet can be used to conduct TDD
 activities. For distance tutoring, access to a telephone jack is also required.
- To set-up and confirm the operation of a standard TDD/telephone configuration takes less than five minutes.
- To set-up and confirm the operation of a simulation suite consisting of two telephones, two TDDs, and a TLSD takes approximately 10 minutes;
- 4. To set up and confirm the operation of a game-show type configuration consisting of four TDDs and a TLSD takes approximately 15 minutes.
- 5. Because of the time required to set-up equipment, configuration of one room as a simulation centre is desirable, although not critical.
- 6. Configuration of a tutorial room as a TDD simulation centre does not restrict the room from being used for other purposes.

Impact on Organizational Objectives. As the study was concluding, discussions took place at a BLC board meeting concerning the future direction of the Council. In these discussions it was agreed that the Council had to make a greater effort to attract both students and tutors from outside the City of Barrie. While this decision cannot be attributed to the study, conduct of the study did increase awareness of the challenges faced by rural students and may have contributed to this decision.

Summary. In a number of respects, the BLC was not an ideal venue for this study: it was a traditional, face-to-face agency; it had a serious space problem; and it had not yet fully embraced the use of technology in instruction. From another

perspective, the BLC was an excellent choice. Because, the Council followed an accredited and widely accepted instructional program, the *Laubach Way to Reading*, and because it adhered to national standards for tutor training, the problems that were encountered were likely typical of those that would have be encountered in many other agencies. This conclusion seems to be born out by the similarity of the findings with those obtained by other researchers in other locations (Turner, 1993; Hopey et al., 1996; Jaffee, 2001). Therefore, while the lack of ideal conditions complicated the study, they also increased its relevance and applicability to other literacy agencies.

Notwithstanding the initial reticence of some staff and tutors to participate in the study, five staff members and seven tutors eventually undertook training. In discussions, these individuals advanced a number of reasons for distance tutoring and for using technology in instruction. While the study did not transform the council into a distance learning agency, it did heighten awareness of the needs of rural students and the potential for use of technology in both face-to-face and distance learning.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

Introduction

The intent of this study was to determine if the TDD could be used as an instructional device for adult literacy instruction, and under what conditions. Although the TDD had previously been used for distance learning by the hearing impaired, it had not been used by this group, or for this purpose before. The results of the study indicate that the TDD can be used in face-to-face and simulated distance environments with adult learners, and that it has potential for wider employment in distance education. They also indicate, however, that a different model of TDD may better meet the needs of literacy students, that integration of this technology with other instructional technologies is important, and that various contextual issues must be addressed before the full potential of the device can be realized.

Conclusions and recommendations are presented in the following sequence:

- 1. conclusions with respect to the five research questions;
- implications with respect to tutor training and the integration of technology in instruction;
- 3. recommendations with respect to additional research;
- 4. envisionment of how the technology can be applied in the future;
- 5. challenges to dissemination of the innovation; and
- 6. recommendations with respect to employment of the technology.

Technical Viability

Is the TDD a technically viable instructional technology for adult literacy instruction? The almost total absence of technical problems throughout the eight weeks of the study, combined with the demonstrated ease of setup and operation, lead to the conclusion that the TDD is a technically viable educational technology. Having noted this, it is apparent that other in-service equipment could have performed even better than the test equipment.

From the study it can be concluded that a TDD optimized for adult literacy instruction would incorporate the following features:

- 1. the capability to connect directly to the telephone system;
- 2. a full-size keyboard;
- 3. a display capable of displaying 80 or more characters;
- 4. an integral full-size printer;
- an integral, cordless handset that is optimized for VCO communications and capable of accepting a standard headset;
- 6. the capability of communicating using ASCII code so that both upper and lower case letters can be used; and
- 7. the capability to allow pre-composition of textual materials (e.g., lessons in the case of tutors, and homework assignments in the case of students).

Devices used in group activities should also be equipped with caller identification so communicants do not have to manually identify themselves every time they type a message.

A review of products currently being offered by TDD suppliers identified that all of the required features are already available on various, different equipment models. However, no model was identified that incorporates all of the required features. Development of a TTY model that is optimized for use in distance learning should therefore be pursued. It is anticipated that the developmental cost of such a device should be relatively low since all of the required features are already found on various in-service devices. Of note, this type of device may be of interest not only to adult literacy students, but also to members of the hearing impaired community, who are engaged in distance learning.

Although the intent of the study was to identify an *alternate* technology to the telephone and computer, it became apparent during the study that integration of technologies is extremely important both for pedagogical reasons, and reasons of economy. For example, as demonstrated during the study, audio prompts using the telephone can increase the effectiveness of text exercises using the TDD. Similarly, the ability to design, prepare, edit, save and communicate lesson materials using a computer would increase the versatility of the TDD by allowing instructors to prepare lesson materials in advance, exchange them with each other, and save them for future use. The upshot is that future evaluations of the TDD as an instructional device should consider it within the context of an integrated, multiple-technology learning environment.

It might initially appear that using computers in conjunction with TDDs would reduce the cost-saving advantage of the TDD over other technologies. The exact opposite appears to be the case; use of computers with TDDs may actually improve

the cost effectiveness of this technology. Kunz and Tsoukalas (2000) indicate that over 80% of adult literacy teachers in the Province of Ontario already own their own computers, and those who do not, have access to them at their schools and literacy agencies. While most home and school computers cannot communicate directly with TDDs, computers can be made TDD compatible by adding a modem designed for this purpose. The cost of such a modem is less than the cost of a TDD. In fact, the cost of equipping a student with an ASCII capable TDD and a tutor with an ASCII capable modem is significantly less than the cost of equipping both individuals with older ATA2 code TDDs. It therefore appears that equipping instructors with modems instead of TDDs could reduce the overall cost of instruction, while simultaneously improving the overall quality of communications.⁴ A cost-benefit analysis of utilizing the telephone, computer and TDD, both alone and in combination, is warranted.

Is the TDD a useful instructional vehicle for teachers and tutors? During the study, the TDD was used in face-to-face and simulated distance environments to conduct a variety of learning activities that are conducted routinely in one-on-one, face-to-face tutoring sessions. The same print based resources that are routinely used in face-to-face instruction (e.g., dictionaries, workbooks, worksheets), as well

For cost comparison purposes, the following devices manufactured by Ultratec Inc. were used: the Ultratec Intele-modem (US \$329), the Ultratec Pro 80 Gold TDD (US \$649), and the Ultratec Pro 80 Gold TDD with ASCII (US \$699). The total cost of the modem and ASCII TDD is US \$270 less than the cost of two standard TDDs (Ultratec Inc., 2005).

as the *Adult Literacy Distance Tutoring Handbook* (Appendix C) were used in these activities. The following can be concluded from these lessons:

- The TDD can be used to conduct many learning activities that are normally conducted face-to-face. Further, the device can be used for both one-on-one and small group activities.
- 2. Tutors and students require operator training prior to using the devices for learning activities. This training must cover how to set-up equipment, initiate calls, and conduct typographic conversations.
- 3. Greater planning is required for distance learning activities than for face-to-face activities. To avoid confusion and delays, issues such as what books and supplies will be used for lessons, when calls will be made and by whom, and what equipment will be required need to be worked out in advance This is true for face-to-face lessons as well, but the implications are more significant in distance learning because it is more difficult to make adjustments when the participants are not working in the same space.
- 4. Group activities can be conducted using TDDs, but they require thorough preparation. To avoid confusion and delays, details on how the conference call will be established, and how the activity will be controlled, need to be worked out in advance (see Chapter 3 of Appendix C for details). Working out such details is best done face-to-face or on the telephone, rather than by TDD message.

Learning Vehicle

Is the TDD a useful learning vehicle for students? The study identified that students enjoyed working with the TDD, that learning activities could be tailored to meet the needs of individual students, and that the device could be used to encourage active learning. It can be concluded, therefore, that the TDD can be a useful learning vehicle. However, to optimize the effectiveness of the technology, the following needs to occur:

- Tutors need to adopt and adapt learning activities to meet the needs of individual students. They need to identify the appropriate combination of voice-only, text-only, and voice and text activities. Similarly, they need to select activities that compliment other types of learning that students are engaged in.
- 2. The appropriate equipment must be used. The equipment used in the study was not optimized for instructional purposes, which detracted from learning.
- Student involvement in the design of activities should be encouraged. This is
 particularly the case when operating at a distance because the tutor may not
 be fully aware of the individual context of the learner.
- Caution must be exercised when selecting participants for group activities.
 Some students lack the self-confidence to participate in such activities.
- 5. Learning activities should be selected that take into account the technical characteristics of the particular devices that are being used. For example, written dialogue exercises exploit the immediate nature of TDD communications and encourage student engagement. Conversely, text

revision exercises are difficult using a standard TDD because full sentences cannot be viewed on the short, 20-character display.

Technological Progression

Can TDDs assist learners with moving to computer-based means of instruction? The results of the study indicate that most students, notwithstanding their limited literacy skills, have an understanding of the different roles that technologies play in their lives. Students understand that TDDs and computers are technologies that share some characteristics, but also that they are fundamentally different. While TDDs can be used to *support* both face-to-face and distance tutoring, computers can be used for a wide variety of complimentary and supplementary purposes. The upshot is that use of the TDD does not necessarily lead to use of the computer, but can parallel it for separate functions.

Having noted this, some of the latest TDD models are capable of communicating with computers using ASCII code. This capability could significantly alter how TDDs and computers are viewed and used. Additional research in this area is warranted.

Characteristics of Tutors and Students

What are the characteristics of tutors and students who can use TDDs most effectively? As previously indicated, limitations in the study preclude drawing detailed deductions about the ability of different types of tutors to employ the TDD. What can be concluded, however, is that, notwithstanding the simplicity of the TDD, tutors require training to make best use of its capabilities, and minimize the impact of its limitations. This is particularly the case with respect to using TDDs to conduct

group activities. Knowledge of communications protocols is critical to ensuring that these activities flow smoothly. It can be concluded that tutors with technical training on the TDD and knowledge of how to employ it can use it more effectively than untrained practitioners.

From the study results it can also be concluded that most students are able to use a TDD in a simulated distance-learning environment without difficulty. The findings indicate, however, that some students would likely have difficulty operating the devices at a true distance. After the initial instructional period, all Level 2 student participants (those students with basic literacy skills but not yet functionally literate) were able to use the devices for a wide variety of activities including both one-on-one and small-group activities. Further, these students were able to devise new uses for the devices that met their individual learning needs. These students should be able to use the devices at a true distance without difficulty.

On the other hand, *some* Level 1 students, those students lacking basic literacy skills, experienced difficulty using the machines even when assisted by a tutor or paired with another student. This did not include all Level 1 students; some were able to use the devices quite effectively, particularly in one-on-one and small-group activities. The ability of a Level 1 student to use the device appears to be determined by a combination of factors including the student's self-confidence, his or her specific literacy skills, and his or her familiarity with technology. The following can be concluded:

- Most Level 2 students should be able to use TDDs for learning activities after receiving basic operator training. Detailed screening of Level 2 students should *not* be required in most instances.
- Level 1 students must be assessed individually to determine if they are able to use the TDD in learning.
- 3. In addition to requiring basic operator training and instruction on communications protocols, Level 1 students may require more experience using the devices in face-to-face and simulated distance environments prior to using them at a true distance. This experience may be required as much to build confidence, as to learn how to operate the device.
- Additional research is required to better define (a) the characteristics of Level
 students who are able to use the technology; and (b) instructional strategies
 that will assist Level 1 learners with using the technology.

<u>Implications</u>

Training of Tutors. One of the characteristics of the TDD that tutors repeatedly commented upon was how simple it was to operate. They also were impressed by the fact that it could be used for both individualized and small group instruction, and they could use it to conduct many familiar, face-to-face learning activities. The popularity of the device may have been influenced in part by the fact that, as volunteers, they had only a limited amount of time to devote to training. The TDD allowed them to build upon previously acquired skills, and make good use of time.

While many tutors were impressed with the versatility of the TDD, most matched tutors expressed a reluctance to use the device in their own tutoring. This reluctance to use the technology was consistent with findings of other researchers, using other technologies, in other locations (Pachon et al., 2000; Askov et al., 2003). When the study was being planned, some hesitation on the part of tutors to use the devices was anticipated, but it was also anticipated that the close relationship that existed between the researcher and Literacy Council members would allay most concerns. Unfortunately, this did not always prove to be the case, and some staff members and tutors indicated that they viewed the introduction of any distance into the tutor/student relationship negatively. Conclusions that can be drawn from this experience include:

- Technology must be presented as a means of reducing the temporal and physical distances that can exist between tutors and students. In this study, this was difficult because the majority of Literacy Council members, matched tutors and students, had established, face-to-face tutorial relationships.
- Technology must be presented not just as a means of teaching and developing skills, but improving access to learning. Tutors must understand that reliance solely upon face-to-face methods restricts student access.

Integration of Technology in Instruction. While the BLC has a good selection of technological assets available, these assets are underutilized. This appears to be due in part to a lack of technological training for tutors. Use of technology is barely

training; and there is no training available in distance tutoring techniques. Further, training programs that do exist, such as basic tutor training and AlphaRoute mentor training, are not integrated. The upshot is that many tutors are not only unable to use available technological assets; they do not even know that they exist. Therefore, aside from the particular issues associated with the use of TDD technology, it is apparent that the whole issue of the integration of technology in literacy instruction is in need of urgent attention.

Several possibilities exist for the technological training of instructors. These include (a) extending basic tutor training to include more technical training; (b) adopting a more aggressive approach towards in-service training including imposing mandatory maintenance of competency training; (c) training some tutors specifically to provide technical support; and (d) combinations of these alternatives. Similarly, several alternatives exist for integrating the training required to use new technologies. These include (a) providing all active tutors with the required training; (b) providing training to individuals on an as required basis; (c) setting up teams of tutors skilled in the particular technology; and (d) combinations of these alternatives. Until such time as these training issues are resolved, the introduction of any new technology in the organization, including the TDD, is likely to be problematic.

The above having been noted, it is important to note that the BLC's freedom of action with respect to introducing and integrating technical training is extremely limited. The Literacy Council conducts basic tutor training, but it is not responsible for its design. This is the responsibility of LLC. Similarly, the Council is responsible

for certain aspects of AlphaRoute instructor and student management, but Alphaplus Centre, a Government of Ontario agency, provides AlphaRoute mentor training. The upshot is that the training prescribed and provided by these higher-level agencies needs to be adjusted and reconciled and it is beyond the capabilities of the BLC to do so. This implies a significant coordinating role for national agencies such as MCL.⁵

Additional Research

The study identified that the TDD can be used to support adult literacy instruction and the attainment of individual learning goals. In many respects, however, the study raised more questions than it answered. The following issues can be added to those that have already been identified for further research:

- 1. The use of distance tutoring as a compliment to face-to-face tutoring has not been fully explored. Even tutors who are reluctant to use technology in instruction acknowledge that, under certain circumstances, distance tutoring could be useful. These conditions need to be defined and instructional strategies developed for tutors.
- 2. The study confirmed the viability of the TDD as a means of conducting a variety of different types of learning activities, but it did not confirm the merit

MCL is a national non-profit organization representing literacy coalitions, organizations, and individuals. Its mission includes supporting collaboration between member organizations (MCL,

116

2005).

of these activities as learning vehicles. Further, it does not necessarily follow that the merits of an activity in face-to-face mode are identical to those in distance mode. For example, several tutors noted that written dialogue exercises conducted using the TDD were more effective than when conducted using handwritten communications. The upshot is that the impact of the imposition of both the technology and distance on learning activities needs to be evaluated.

3. The TDD was successfully employed in a simulated distance environment, but was not deployed at a true distance. Given that the TDD is a proven communications technology, technical performance of the device is not a serious concern, but the impact of distance on both the tutor/student relationship and instructional techniques and methods need to be assessed.

Revised Envisionment

When this study was being planned, it was envisioned that tutors with a minimal amount of technical training would be able to use TDDs to deliver one-to-one instruction to adult literacy students at a distance. It was further envisioned that use of TDDs would facilitate use of computers, and that use of computers would eventually supplant the use of TDDs with students. As has been described, this envisionment was not reflected in all of the study's findings.

Based upon the study, it is still anticipated that TDDs can play a significant role in adult literacy instruction, but this role will be somewhat different from that which was originally envisioned. It is now envisioned that:

- TDDs will be used not just in distance learning but face-to-face settings as well.
- TDDS will be used for both one-to-one and small group activities.
- While basic TDD models may still have some applications, devices that
 incorporate a variety of advanced features such as ASCII mode,
 extended character displays, and scroll back capability are likely to
 prove much more versatile. Operating these advanced devices in
 conjunction with computers equipped with TTY modems will
 compensate for the cost of the added features.
- TDDs will be used in concert with computers, not merely as lead-ins to their use. TDDs will provide an economical means of conducting oral and typographic tutoring sessions at a distance, while computers will be used for a variety of other functions. Computers will also enable instructors to prepare lessons in advance and store them for future use.
- Tutors will require minimal technical training in how to use the devices,
 but they will need instruction in how to employ the devices in
 instruction before they will be able to use them effectively.
- TDDs will be employed most effectively in organizations that are committed to improving access to learning and the quality of instruction. These organizations will embrace the use of a variety of technologies that complement face-to-face instruction.

Diffusion of the Innovation

While the study demonstrated that the TDD could be a useful vehicle for the delivery of adult literacy instruction, adoption of the device by literacy agencies poses a variety of challenges. As Rogers (1995) indicates, getting a new idea adopted, even when it has obvious advantages, is often very difficult. While developing a diffusion plan for application of the TDD to adult literacy instruction is beyond the scope of this thesis, it is possible to identify where the main effort will most likely be required.

Rogers (1995) defined diffusion "as the process by which an *innovation* is *communicated* through certain *channels* over time among the members of a *social system*" (p. 10). He noted that the four main elements of diffusion are the innovation, communication channels, time, and the social system. This innovation, application of the TDD to adult literacy instruction, is relatively well developed. While, as previously indicated, improvements are needed in the technology and additional research is required on application of the technology in various learning situations, the innovation is capable of being used now. Therefore, while additional work is needed on the technology, this work should be relatively straightforward.

Communications channels within the adult literacy community are very well developed. All of the major adult literacy agencies in Canada have good internal communications systems. For example, both LLC and MCL publish both paper-based and Web-based newsletters. These agencies also hold periodic conferences at which information on innovations can be disseminated. Similarly, at the local level, most literacy councils have good systems for the passage of information. The BLC,

for example, prepares a bi-monthly newsletter and disseminates it both in paperbased and electronic formats. In summary, adequate vehicles are available for the dissemination of information on the innovation.

Rogers (1995) indicates that time is required for the "innovation-decision process" (p. 36), and this process entails five steps: (a) knowledge, (b) persuasion, (c) decision, (d) implementation, and (5) confirmation. With respect to this innovation, it is anticipated that time could pose a serious challenge. Part of this challenge arises from the fact that there are many different, only loosely linked organizations involved in adult literacy instruction. To co-ordinate the activities of these various organizations is a significant challenge, particularly for smaller agencies. For example, the BLC must coordinate its efforts with the Ontario Ministry of Training, Colleges and Universities; Laubach Literacy Canada; Alphaplus Centre; and a variety of local educational and social agencies. This can be a time-consuming task for the organization.

Time is also a challenge because most adult literacy agencies are primarily staffed by volunteers, who have only a limited amount of time to devote to the five steps in the dissemination process. Also, because literacy instruction is normally delivered at a relatively low rate (for example, several hours per week), it can be anticipated that some of the steps in the dissemination process will take a considerable amount of time. This is particularly the case with the *implementation* and *confirmation* steps. For these various reasons, it is anticipated that a considerable effort will be required to address the time component of dissemination.

Finally, the social system that exists within many literacy agencies may pose a very significant challenge to the diffusion of this innovation. As discussed at the outset, a very strong social culture exists in literacy agencies. As a number of authors have indicated (Pachon et al., 2000; Askov et al., 2003) and this study demonstrated, the norms of this culture do not always support the adoption of innovations such as use of the TDD in instruction. To the contrary, as a number of study participants indicated, within the adult literacy community, technology is often viewed as an impediment to learning, not an aide. This bias may be the single most significant hurdle that must be overcome in the dissemination of this and other technological innovations.

Field Deployment

While a number of barriers must be overcome by literacy agencies before the TDD can be introduced on a wide scale basis as a means of improving access to literacy instruction, the technical viability of the TDD combined with its demonstrated instructional potential and its ability to support learning indicate that it is ready for limited employment in a distance context. Given the proven capability of Level 2 students to use the device in face-to-face and simulated distance environments, they should be the first students to use the devices at a true distance. Conversely, given the mixed results of Level 1 students during the study, their use of the device should initially be restricted to face-to-face and simulated distance environments.

Furthermore, Level 1 students should not be asked to use the devices at a distance until they have successfully demonstrated in a controlled environment that they are capable of doing so. Research should continue on the application of these devices

basis.

REFERENCES

- Alphaplus Centre. (2003, September). What difference does it make? Literacy learner perspectives on Web-based learning with AlphaRoute. Toronto, Ontario, Canada: Author.
- Alphaplus Centre. (2004). What is AlphaRoute? Retrieved June 4, 2004 from, http://alphaplus.ca/alpharoute.html
- Anderson, J. (1991). Technology and adult literacy. London: Routledge.
- Anderson-Inman, L. & Horney, M.A. (1998). Transforming text for at-risk readers. In
 D. Reinking, M.C. McKenna, L.D. Labbo, & R.D. Kieffer (Eds.), *Handbook of literacy and technology: Transformations in a post-typographic world* (pp. 15-43). Mahwah, NJ: Erlbaum.
- Askov, E.N. (2001). What's in a definition? The implications of being defined and strategies for change [Electronic version]. *The Canadian Journal for the Study of Adult Education, 15*(2), 7-18.
- Askov, E.N., Johnston, J., Petty, L.I., & Young, S.J. (2003). Expanding access to adult literacy with online distance education. Retrieved September 19, 2004 from Harvard Graduate School of Education, National Center for the Study of Adult Learning and Literacy Web site:
 - http://ncsall.gse.harvard.edu/research/op_askov.pdf
- Barker, L.C. (2005, March). Linking literacy and e-learning research in Canada.

 Literacy on the Move, 10-11.
- Barrie Literacy Council. (2003). Where do our students and tutors live? Barrie, Ontario, Canada: Author.

- Barrie Literacy Council. (2004). *Barrie Literacy Council conceptual framework.*Barrie, Ontario, Canada: Author.
- Barrie Literacy Council. (2005a). *About us.* Retrieved May 9, 2005 from, http://www.nald.ca/barrie/about.html
- Barrie Literacy Council. (2005b). [Program statistics]. Unpublished raw data.
- Barrie Literacy Council. (2005c). [Basic literacy skills activity report for the period 1

 April 31 July 2005]. Unpublished raw data.
- Baron, D. (2001). From pencils to pixels: the stages of literacy technologies. (2001). In E. Cushman, E.R. Kintgen, B.M. Kroll & M. Rose (Eds.). *Literacy: A critical sourcebook* (pp. 70-84). Boston: Bedford/St. Martin's.
- Bates, A.W. & Poole, G. (2003). Effective teaching with technology in higher education. San Francisco: Jossey-Bass.
- Behrmann, M. & Jerome, M. K. (2002). Assistive technology for students with mild disabilities (Report No. EDO-EC-02-01). Arlington, VA: ERIC Clearinghouse on Disabilities and Gifted Education. (ERIC Document Reproduction Service No. ED463595)
- Bogdan, R.C. & Biklen, S.K. (1998). *Qualitative research for education: An introduction to theory and methods* (3rd ed.). Boston: Allyn and Bacon.
- Brickman, A., Braun, L.W. & Stockford, M. (2000). An evaluation of the use of technology in support of adult basic education in Massachusetts. Retrieved October 11, 2004 from http://www.alri.org/maltt/maltteval.pdf

- Cameron, J. & Rabinowitz, M. (1988). *A guide for tutoring adult literacy students*.

 Victoria, British Columbia, Canada: Province of British Columbia, Ministry of Advanced Education and Job Training.
- Canadian Centre for Philanthropy. (2004a). *Volunteering in Canada*. Retrieved June 4, 2004 from,

 http://www.givingandvolunteering.ca/pdf/factsheets/2000_CA_volunteering_in

 _canada.pdf
- Canadian Centre for Philanthropy. (2004b). Volunteering trends in Canada 1987-1997. Retrieved June 4, 2004 from

 http://www.givingandvolunteering.ca/factsheets/1997_CA_trends_1987-1997.asp
- Carlin, C. & Steele, V. (1999, December). Technology and adult learning: A collection of current perspectives [Special issue]. *Literacy Practitioner*, 5(2).
 (ERIC Document Reproduction Service No. ED437503)
- Cartwright, F. & Allen, M.K. (2002). *Understanding the rural urban reading gap*.

 Ottawa, Ontario, Canada: Statistics Canada. Retrieved September 13, 2004 from http://www.statcan.ca/english/research/81-595-MIE/81-595-MIE2002001.pdf
- Cousin, G. (2000). Strengthening action-research for educational development.

 Retrieved April 15, 2005, from Coventry University, Centre for Higher

 Education Development Web site:

 http://legacywww.coventry.ac.uk/legacy/ched/research/strengthar.htm

- Creswell, J.W. (2003). Research design: Qualitative, quantitative, and mixed methods approaches. London: Sage.
- Dick, B. (2000) A beginner's guide to action research. Retrieved April 15, 2005 from http://www.scu.edu.au/schools/gcm/ar/arp/guide.html
- Dick, B. (1999) Sources of rigour in action research: addressing the issues of trustworthiness and credibility. Paper presented at the meeting of the Association for Qualitative Research, Melbourne, Victoria, Australia.

 Retrieved April 15, 2005, from

 http://www.ug.net.au/action_research/arp/rigour3.html
- Franklin, U.M. (1999). *The real world of technology* (Rev. ed.). Toronto, Ontario, Canada: Anansi.
- Ginsburg, L. (1998). Integrating technology into adult learning. In C. Hopey (Ed.),

 Technology, basic skills, and adult education: Getting ready and moving
 forward (pp. 37-46). Columbus, OH: Educational Resources Information

 Center, Clearinghouse on Adult, Career, and Vocational Education. Retrieved

 October 11, 2004 from the Texas Center for the Advancement of Literacy and

 Learning Web site: http://www-tcall.tamu.edu/erica/docs/hopey/hopey_04.pdf
- Harwood, C. (2001). *Handbook for literacy tutors*. Edmonton, Alberta, Canada: Grass Roots Press.
- Herod, L. (2000). *Integrating technology into Canadian adult literacy programs: The*need for a curriculum deliberation process. Retrieved October 14, 2004, from

 http://www.nald.ca/fulltext/herod/march/cover.htm

- Holdstein, D.H. & Selfe, C.L. (Eds.). (1990). Computers and writing: Theory, research and practice. New York: The Modern Language Association of America.
- Hopey, C. (1998a) Making technology happen in adult education. In C. Hopey (Ed.), *Technology, basic skills, and adult education: Getting ready and moving forward* (pp. 3-9). Columbus, OH: Educational Resources Information Center, Clearinghouse on Adult, Career, and Vocational Education. Retrieved October 11, 2004 from the Texas Center for the Advancement of Literacy and Learning Web site: http://www-tcall.tamu.edu/erica/mp_hopey_01.asp
- Hopey, C. (1998b) Recommendations for using technology in adult education. In C.
 Hopey (Ed.), Technology, basic skills, and adult education: Getting ready and moving forward (pp. 47-48). Columbus, OH: Educational Resources
 Information Center, Clearinghouse on Adult, Career, and Vocational
 Education. Retrieved October 11, 2004 from the Texas Center for the
 Advancement of Literacy and Learning Web site: http://www-tcall.tamu.edu/erica/docs/hopey/hopey 05.pdf
- Hopey, C.E., Harvey-Morgan, J. & Rethemeyer, R.K. (1996). *Technology and adult literacy: Findings from a survey on technology use in adult literacy programs*(NCAL Technical Report No. TR96-12). Retrieved October 14, 2004, from the University of Pennsylvania, National Center on Adult Literacy Web site: http://www.literacyonline.org/products/ncal/pdf/TR9612.pdf

- Howie, S.H. (1994). Adult literacy in a multiliterate society. In M.C. Radencich (Ed.),

 Adult literacy: A compendium of articles from the Journal of Reading (pp. 181200). Newark, DE: International reading Association.
- Huck, S.W. & Cormier, W.H. (1996). *Reading statistics and research* (2nd ed.) New York: Harper Collins.
- Human Resources Development Canada. (2002). *Adult literacy: Policies, programs*and practices: Lessons learned (Report No. SP-AH113E-03-00). Retrieved

 September 13, 2004 from http://www11.hrdc
 drhc.gc.ca/pls/edd/ALPPP 137000.htm
- Imel, S. (1996). Adult literacy education: Emerging directions in program development (Report No. EDO-CE-96-179). Washington, DC: Office of Educational Research and Improvement. (ERIC Document Reproduction Service No. ED402475)
- Imel, S. (1999). Using Technologies effectively in adult and vocational education. *Literacy Practitioner, 5*(2). 12–14.
- Jaffee, L.L. (2001). Adult literacy programs and the use of technology. *Adult Basic Education 11(*2), 109-24.
- Jennings, T. (2004). ASCII: American Standard Code for Information Infiltration.

 Retrieved June 16, 2005, from http://www.wps.com/projects/codes/#ITA2
- Johnson, B. & Christenson, L. (2000). Educational research: Quantitative and qualitative approaches. Boston: Allyn and Bacon.
- Kamil, M.L., Intrator, S.M. & Kim, H.S. (2000). The effects of other technologies on literacy and literacy learning. In M.L. Kamil, P.B. Mosenthal, P.D. Pearson &

- R. Barr, (Eds.) *Handbook of reading research* (Vol. 3) (pp. 771-788). Mahwah, NJ: Erlbaum.
- Keegan, J. (1999). Foundations of distance education (3rd ed.). London: Routledge.
- Kunz, J.L. & Tsoukalas, S. (2000). Riding the technological wave: Experiences of adult literacy students and teachers in Ontario. Ottawa, Ontario, Canada:Canadian Council on Social Development.
- Knuth, R., Hopey, C. & Rocap, K. (Eds.) (1996). Guiding questions for technology planning: Version 1.0. Retrieved October 11, 2004, from http://www.ncrtec.org/capacity/guidepdf/guide.pdf
- Landow, G.P. (1992). Hypertext, metatext, and the electronic cannon. In M.C.

 Tuman, Literacy online: The promise (and peril) of reading and writing with computers (pp. 67-94). Pittsburgh, PA: University of Pittsburgh Press.
- Laubach, F.C. (1990). *Teacher*. (K.R. Norton, Ed.). Syracuse, NY: Laubach Literacy International.
- Laubach, F.C., Kirk, E.M., & Laubach, R.S. (1981). Laubach way to reading:

 Teacher's manual 1. Syracuse, NY: New Readers Press.
- Laubach Literacy Action. (1994). *Teaching adults: A literacy resource book*.

 Syracuse, NY: New Readers Press.
- Lang, H.G. (2000). A phone of our own: The deaf insurrection against Ma Bell.

 Washington: Gallaudet University Press.
- Larocque, D.P. (1999). *AlphaRoute (Phase 2): A research report*. Retrieved

 November 15, 2004, from http://alphaplus.ca/images/alpharoutephase2e.pdf

- Laubach Literacy Canada. (2003). *Laubach enhanced training system*. Retrieved June 23, 2004, from http://www.laubach.ca/updater.pdf
- Leu, D.J. (2000). Literacy and technology: Deictic consequences for literacy education in an information age. In M.L. Kamil, P.B. Mosenthal, P.D. Pearson & R. Barr (Eds.). *Handbook of reading research* (Vol. 3) (pp. 743-770). Mahwah, NJ: Erlbaum.
- Leu, D.J., Karchmer, R., & Leu, D.D. (1999). The Miss Rumphius effect:

 Envisionments for literacy and learning that transform the Internet. *The Reading Teacher*, *52*, 636–642.
- MacIsaac, D. (1996). *An introduction to action research*. Retrieved March 30, 2005, from, http://physicsed.buffalostate.edu/danowner/actionrsch.html
- Marshall, S., Nussbaum, D., & Waddy-Smith, B. (1999). Kendall school integrates literacy skill development with auditory and speech services. In *Perspectives in Education and Deafness*, *17*(5). Retrieved 15, November 2004, from http://clerccenter.gallaudet.edu/Products/Perspectives/may-jun99/marshall.html
- Mason, T. (2001). Philosophies of adult education movements in 20th century

 Canada: implications for current literacy educators [Electronic version]. *The*Canadian Journal for the Study of Adult Education, 15(2), 61-78.
- Mayer, R.E. (2001). *Multimedia learning*. New York: Cambridge University Press.
- McClintock, N. (2004). *Understanding Canadian volunteers*. Toronto, Ontario, Canada: Canadian Centre for Philanthropy. Retrieved June 1, 2004 from,

- http://www.givingandvolunteering.ca/pdf/reports/Understanding_Volunteers.p
- Mingle, M.E.H. (1999) Strategies for the 21st Century: Integrating technology into the ABLE environment. Lock Haven: University of Pennsylvania, West Branch Technology Center. (ERIC Document Reproduction Service No. ED435823)
- Ministry of Training, Colleges and Universities. (2000). *Literacy Ontario: Literacy and basic skills program guidelines*. Toronto, Ontario, Canada: Queen's Printer for Ontario.
- Movement for Canadian Literacy (2004). Factsheet: Literacy in Canada. Retrieved October 15, 2003 from http://www.literacy.ca/litand/1.htm
- Movement for Canadian Literacy (2005). *About MCL*. Retrieved August 1, 2005 from http://www.literacy.ca/about/about.htm
- Newman, J.M. (2000). Action research: A brief overview. *Forum: Qualitative Social Research*, 1(1). Retrieved March 30, 2005 http://www.qualitativeresearch.net/fqs-texte/1-00/1-00newman-e.htm
- Olgren, C.H. (1997). Teaching by telephone. In *New directions for teaching and learning*, 71. 59-66.
- Ontario Rural Literacy Special Interest Group (1994). *Distinct needs of rural literacy*programs. Retrieved March 18, 2004, from

 http://www.nald.ca/fulltext/report2/rep18-01.htm
- Pachon, H.P., Macias, E.E. & Bagasao, P.Y. (2000) *Minority access to information technology: Lessons learned.* (Occasional Paper No. 67, Latino Studies Series). Retrieved October 14, 2004, from Michigan State University, Julian

- Samora Research Institute Web site:

 http://www.jsri.msu.edu/RandS/research/ops/oc67.pdf
- Padolina, M.C.D. (1997, May). *Use (and misuse) of technology in distance education.* Paper presented at the Asia Literacy Regional Forum. Manila, Philippines. (ERIC Document Reproduction Service No. ED416313)
- Reinking, D. (1998) Introduction: Synthesizing technological transformations of literacy in a post-typograhic world. In D. Reinking, M.C. McKenna, L.D. Labbo, & R.D. Kieffer (Eds.), *Handbook of literacy and technology:*Transformations in a post-typographic world (pp. xi-xxx). Mahwah, NJ: Erlbaum.
- Rekkedal, T. (1989). The telephone as a medium for instruction and guidance in distance education: Report from an experiment at NKI, Norway. Bekkestua, Norway: Norwegian Centre for Distance Education.
- Robinson, B. (1984). Telephone teaching. In A.W. Bates, (Ed.), *The role of technology in distance education*, 121-138. Beckenham, Kent, U.K.: Croom Helm.
- Rogers, E.M. (1995). Diffusion of innovations (4th ed.). New York: The Free Press.
- Rosen, D.J. (1996). How easy is it for educators to use the information superhighway? Washington, DC: National Institute for Literacy. (ERIC Document Reproduction Service No. ED392964)
- Schram, W. (1977). Big media, little media: Tools and technologies for instruction.

 London: Sage.

- Schwartz, J. (1990). Ethical considerations of computer use. In D.H. Holdstein & C.L. Selfe (Eds.), *Computers and writing: Theory, research and practice* (pp.18-30). New York: Modern Language Association of America.
- Scott, S.M. (1989). Philosophies in action. In S.M. Scott, B. Spencer & A.M. Thomas (Eds.), *Learning for life: Canadian readings in adult education (pp. 98-106)*.

 Toronto, Ontario, Canada: Thompson Educational Publishing.
- Selfe, C.L. (1999), *Technology and literacy in the twenty-first century*. Carbondale: Southern Illinois University Press.
- Selfe, C.L. & Hilligoss, S. (Eds.). (1994). Literacy and computers: The complications of teaching and learning with computers. New York: The Modern Language Association of America.
- Selman, G., Cooke, M., Selman, M., & Dampier, P. (1998). *The foundations of adult education in Canada*. Toronto, Ontario, Canada: Thompson Educational Publishing.
- Simpson, O. (2002). Supporting students in online, open and distance education (2nd ed.). :London: Kogan Page.
- Skinner L., Gillespie P. & Balkam, L. (2000). The challenge of adult literacy:

 Students with learning disabilities in the ABE classroom. *Adult Basic Education* 10(3), 147-166.
- Smith, J. (1999). Literacy, welfare and work: Longitudinal research project final report. Retrieved 1 November 2004, from, http://www.nald.ca/fulltext/lwwfinal/lww3.pdf
- Stake, R.E. (1995). The art of case study. Thousand Oaks, CA: Sage Publications.

- Statistics Canada. (2004). *Household Internet use survey: 2003*. Retrieved July 8 2004, from, http://www.statcan.ca/Daily/English/040708/d040708a.htm
- Susman, G. I. & Evered, R.D. (1978) An assessment of the scientific merits of action research [Electronic Version]. *Administrative Science Quarterly*, 23, 582-603.
- Tuman, M.C. (1992). Word perfect: Literacy in the computer age. London: Falmer Press.
- Turner, T. C. (1993). Literacy and machines: An overview of the use of technology in adult literacy programs (Rep. No. TR 93-3). Retrieved October 14, 2004, from the University of Pennsylvania, National Center on Adult Literacy Web site: http://www.literacyonline.org/products/ncal/pdf/TR9303.pdf
- Turner, T. C. (1998). Technology in adult education programs. In C. Hopey (Ed.),

 Technology, basic skills, and adult education: Getting ready and moving
 forward (pp. 59-70). Columbus, OH: Educational Resources Information

 Center, Clearinghouse on Adult, Career, and Vocational Education. Retrieved

 October 11, 2004 from the Texas Center for the Advancement of Literacy and

 Learning Web site: http://www-tcall.tamu.edu/erica/docs/hopey/hopey_07.pdf
- Ultratec Inc. (2005). *Products*. Retrieved October 14, 2004,from http://www.ultratec.com/Shop.html
- Waterhouse, P., Mildenhall, B. & Sefton, R. (1987). *Gippsland distance literacy project: Resource kit for distance adult literacy tutors*. Churchill, Victoria, Australia: Yallourn College of Technical and Further Education.
- Wilson-Lum, C. (1991). *Teaching TTY/TDD skills*. Ottawa, Ontario, Canada: The Capital Region Centre for the Hearing Impaired Literacy Program.

Yin, R.K. (1994). Case study research: Design and methods. London: Sage.

Zucker, H. (1986). Distance education in rural areas. Rome, NY: Syracuse

University.

Appendix A

TELECOMMUNICATIONS DEVICE FOR THE DEAF (TDD) LITERACY RESEARCH PROJECT PARTICIPANT CONSENT FORM

Description of Project

The aim of this project is to determine if TDDs can be used to effectively support adult literacy instruction at a distance. The study is being undertaken by Michael Sweeney as thesis research in his role as an Athabasca University student in the Master of Distance Education program.

The study seeks to answer the following research questions:

- Is the TDD a technically and administratively viable instructional technology for adult literacy instruction?
- Is the TDD a useful instructional vehicle for teachers and tutors?
- Is the TDD a useful learning vehicle for students?
- Can TDDs assist learners with moving to computer-based means of instruction?
- What are the characteristics of tutors and students who can use TDDs most effectively?

Research Plan

The study will use case study methodology. In total, three cases will be studied, each case consisting of a tutor/student pair. The study will be conducted in three phases: a pre-research phase, a research phase, and a post research phase.

- During the pre-research phase, volunteer tutors and students will be selected to participate in the study.
- During the research phase, tutors and students will be instructed in how to use TDDs to establish communications. Tutors will also be instructed in possible ways to use them in their instruction. Tutors and students will then use the TDDs for about six to eight weeks in their tutoring sessions.
- During the final, post-research phase, data will be analyzed, a report will be written, and participants will be advised of the study results.

Information Gathering

At various points during the study, information will be collected from participants. The following collection instruments will be used.

- File Reviews. Literacy Council files will be reviewed to obtain information on the literacy skills and aptitudes of student participants.
- Interviews. Participants will be interviewed during each phase of the study.
- Observation. The Researcher will occasionally sit-in on and observe some tutoring sessions.
- Diaries. Participants will be provided with diaries to record information on their tutoring session.

Time Commitment

It is estimated that the following amount of time will be required to participate in the study:

- For Briefings and Interviews: Students: 3 to 5 hours. Tutors: 5 to 8 hours.
- To Complete Student Diaries: One half hour per week in addition to the amount of time normally spent in tutoring sessions.

Right to Refuse

Participation in this research project is entirely voluntary. Participants may withdraw from the study at any point without consequence. Further, they may elect to participate in the study, but chose not to participate in individual interviews or study activities.

Contact Information

If at any time participants have concerns about how the study is being conducted, they may contact:

Michael Sweeney 85 Cecil Street Angus, ON L0M 1B3 705.424.0425

If participants are not satisfied with the researcher's response, they may contact either of the following individuals:

Dr. Susan Moisey Athabasca University 1 University Drive Athabasca, AB T9S 3A3 1.800.788.9041 (Extension 6401) Ms. Connie Morgan Barrie Literacy Council 80 Bradford St., Unit 244 Barrie, ON L4N 6S7 705.728.7323

Cost and Reimbursement

The research will be conducted at no cost to participants. Participants are, however, expected to assume the cost of their own telephone service.

Participants will not be financially reimbursed for the time that they commit to the study.

Risks and Benefits

No risks to participants are anticipated from participation in the study. Potential benefits include improved learning during face-to-face tutoring sessions, and an ability to conduct some learning at a distance using the TDD for communications. It is also anticipated that use of the devices may ease students' transition from face-to-face to computer-assisted learning

Privacy, Confidentiality and Anonymity

All information gathered during the study will be held confidential, except when legislation or a professional code of conduct requires that it be reported.

Study participants will be assigned a study participant number or pseudonym, which will be used to identify the individual in research project documents. The linkage between study participant numbers, pseudonyms and actual identities will be kept confidential, so as to protect the true identity of participants.

All information gathered during the study will be securely stored and safeguarded. Once the project has been completed and original materials are no longer required, research materials will be destroyed.

Disclosure of Findings

Results of the study will be made available to participants. In particular, a copy of the printed report will be provided to the Barrie Literacy Council for its library. Participants will be advised when this copy is available for viewing. A copy of the report will also be filed with and available online in the Athabasca University Library Digital Thesis and Project Room - http://library.athabascau.ca/DTPR/

CONSENT TO PARTICIPATE

I consent to participate in the Telephone Devices for the Deaf Literacy Research Project under the conditions described above. I understand that my participation is voluntarily and I may withdraw from the project at any time without penalty or consequence.

I authorize my Barrie Literacy Council file to be reviewed for research purposes on condition that its contents be kept confidential and used for research purposes only.

I have beer	n provided with a	copy of this consent form.	
Name	(Print)	Date	Signature
CER	TIFICATION OF	WITNESS TO A STUDEN	T'S SIGNATURE
			rie Literacy Council student. nderstanding of its contents.
Name (Pri	 nt)	Date	Signature

Appendix B

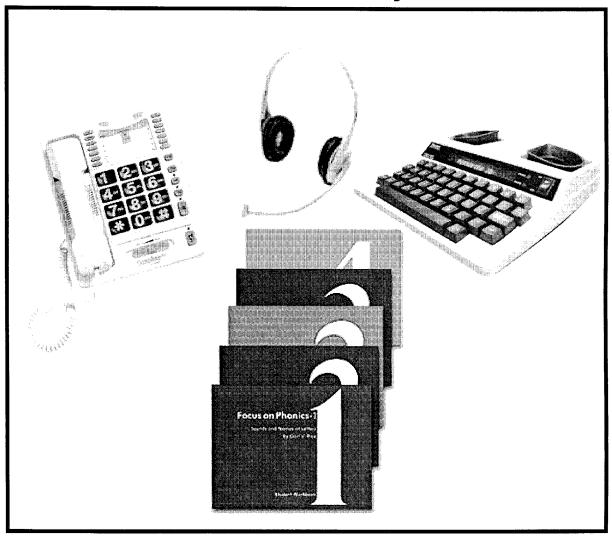
TDD DEMONSTRATION SUITE FEEL FREE TO TRY THE EQUIPMENT

To set up communications:

- Make sure that the 3 pieces of equipment are plugged in and the power bar is turned ON.
- Turn both TDDs to OFF.
- Turn ON one TDD, then push the GA speed key.
- The light on the other TDD will come on and/or the telephone will ring.
- Turn on the other TDD and push the GA speed key.
- When GA appears on both TDDs, you are ready to go.
 Anything you type on one machine will appear on the other one too. It's that simple!
- When done, turn OFF both TDDs

Adult Literacy Distance Tutoring Handbook

Michael Sweeney



Revised 1 June 2005

ACKNOWLEDGEMENT

I gratefully acknowledge the assistance of the staff, tutors and, most importantly, students of the Barrie Literacy Council who provided assistance in the preparation of this handbook. Without their advice, support and encouragement, completion of this project would have been impossible.

I also wish to acknowledge the financial assistance received from the Department of National Defence Personal Enhancement Program, the Government of Alberta Ministry of Learning, and the Athabasca University Graduate Student Research Fund. Their financial assistance enabled this project to be completed.

Thank you

Michael Sweeney

Table of Contents

Part 1	I — I	ln	ıtı	rn	Ч		۸t	io	n
ıaıı		и	ıu	u	u	u	1.	ĸ	

Definit Which Instruc	Distance Tutoring?	1 1 1 2 3 3
Part 2 -Charact	eristics of Communications Technologies	5
Introdo The To The T	elephone	5 5 6
Part 3 – Distand	ce Tutoring Activities	9
Voice-only Activities		9
	General Oral Spelling Activities Fill in the Blank Activities Duet Reading Text Revision Exercises	9 9 10 11 13
Text-c	only Activities	14
	TDD Terminology Word Dominos Modification Activities Dictionary Activities Written Dialogue Writing Tag 20 Questions	14 14 15 16 19 20 21
Voice	and Text Activities	22
	Initiating VCO Communications Phonics Activities Written Spelling Activities Short Answer Activities Revision Activities Message Taking Activities	23 23 25 26 27 28

Group Activities			
Part 4 – Planning Distance Tutoring			
Preliminary Considerations		34	
	Overview Technology Selection Time Confidentiality Distractions Home Study Areas Telephone Selection TDD Selection Study Materials	34 34 34 35 35 36 38	
Lesson Planning and Coordination Cycle			
	Overview In Lesson Activities Post Lesson Activities Final Details	39 40 41 41	
Part 5 – Transitioning to Distance Tutoring			
	Introduction The Tutor/Student Relationship Transition Concept Phase 1 - Face-to-Face Tutoring Phase 2 - Transition Preparation and Training Phase 3 - Implementation of Distance Learning	42 42 42 43 43 45	
Reference List		47	
Appendix A	Study Record and Plan		
Appendix B	Sample of an Individual Study Plan TDD Message		
Appendix C	Configuration of Equipment		
Appendix D	Distance Tutoring Confidentiality Protocol		
Appendix E	TTY/TDD Abbreviations		
Appendix F	International Phonetic Alphabet		

Preface

This handbook is intended to serve as a ready reference for adult literacy tutors when planning, preparing for, and conducting distance tutoring. It was prepared as part of an Athabasca University Master of Distance Education research project being conducted by the author. The intent of the research project was to examine the feasibility of using Telecommunications Devices for the Deaf (TDDs) in adult literacy tutoring.

Activities and processes described in this handbook are based upon established practices in distance training and education. However, the specific activities and exercises that are presented in the handbook may not have been used previously in adult basic education, or adult basic education at a distance. Further, while activities and exercises that entail the use of TDDs have been successfully trialed in a face-to-face context, not all have been applied at a distance.

Because of the experimental nature of this project, your comments are invited and encouraged and should be sent to:

Michael Sweeney 85 Cecil Street Angus, ON L0M 1B3

or

mrsweeney@rogers.com

I sincerely hope that you find this handbook to be useful in your tutoring endeavors.

Michael Sweeney Angus, Ontario May 17, 2005

Appendix C

Part 1 - Introduction

Background

Most adult literacy programs in Canada are based upon individualized instruction; individual students are matched with personal tutors who support them on their learning journey. Normally, tutors provide face-to-face support, but they may use a variety of other approaches, the selection of the approach or approaches being dictated by the requirements of the learner, the capabilities of the tutor, the available instructional resources, and a variety of other situational factors. Some activities that a tutor and student may chose to use to supplement face-to-face tutoring include: participation in group activities such as reading clubs, writing circles, and mathematics groups; use of computers for a variety of purposes; and completion of independent, home-study programs. Distance tutoring is another option that the tutor and student may consider. Distance Tutoring is the provision of learning support by a tutor in one location to a student in another location, using one or more communications technologies.

Intent

The intent of this handbook is to provide adult literacy tutors sufficient information so that they can effectively tutor at a distance. It is assumed that the tutor will have already qualified as a basic tutor with an agency such as Laubach Literacy Canada or Frontier College. The handbook should be useful both to tutors who use distance tutoring only occasionally, and to those who integrate distance tutoring into their regular routine. While the handbook primarily discusses tutoring using the telephone and TDD, the processes and exercises that are discussed should be adaptable to other communications technologies as well.

Definitions

TTY. *Text Typewriter*. A generic term used to describe a variety of different electromechanical typewriters and teleprinters.

TDD. Telecommunications Device for the Deaf. A TTY designed for use by the deaf and hearing impaired. This term is used in this handbook instead of TTY because it more precisely describes the technology being discussed.

Why Distance Tutoring?

Face-to-face tutoring is a proven means of helping adult basic education students attain their literacy goals. Why then is there a need for distance tutoring? Face-to-face tutoring while very effective requires that the tutor and student be able to meet to carry out tutoring activities. In some instances, this isn't possible. In rural areas in particular tutors and students often cannot meet as often as they should. Factors such as isolation, winter weather conditions,

limited or no public transportation, time needed to cover great distances, confidentiality issues, and lack of child care facilities can limit how often a tutor and student can meet. When tutors and students cannot meet face-to-face as often as they'd like, distance tutoring can be a useful alternative.

Which Communications Technology to Use

Various communications technologies including the telephone, short-wave radio, computer, and TDD can be used to support distance tutoring. Short-wave radio is used only rarely today except in extremely isolated locations. Computers on the other hand have a wide variety of uses including, among others: word processing; accessing online instructional resources; running instructional programs; accessing information on the Internet; desktop publishing; and communicating through E-mail, messaging and collaboration tools. For computers to be useful as a means of communication, however, both the tutor and the student need sufficiently powerful machines, Internet access (preferably high-speed), suitable software, and technical support. Both the tutor and student also require appropriate computer skills. If these prerequisites can be met, computer communications should be considered. If on the other hand they cannot, the telephone and TDD may be more appropriate alternatives.

The telephone and TDD, in combination, provide the tutor and student with both an audio and visual means of communication. These devices are widely available in Canada and economical to both purchase and operate. Economy of operation is particularly important because many adult literacy students have limited incomes.

It is important to note that while the TDD was designed as a communications device for the deaf, it is discussed in this handbook as an instructional vehicle for hearing adults. Although this is not a common application of this technology, as described in Part 2 of this handbook, the TDD has significant instructional potential.

Because of the low cost and simple operating procedures associated with the telephone and TDD, this handbook only discusses their use in detail. This having been said, it should be possible with a little imagination to adapt the exercises and activities in the handbook to other current and emerging communications technologies and other educational envisionments.

Finally, using telephones and TDDs for communications does not preclude the use of other technologies for other purposes. The computer in particular is an extremely versatile resource and often available in schools, libraries, employment centres, and literacy agencies for the uses noted above.

Instructional Concepts

The processes and activities described in this handbook are based upon several different sources. Philosophically, they are constructivist in origin; they are intended to allow students to achieve their personal learning goals and build understanding and competencies based upon their individual circumstances and requirements. Organizationally, they draw on business practices and, in particular, processes for the conduct of telephone conferences. Distance tutoring sessions can in fact be viewed as a specialized form of teleconference in which the objective of the *meeting* is to have the student advance his or her individual literacy goals. The business practice component of design is also evident in the processes that are described for planning lessons. Finally, pedagogically, most learning activities are based upon face-to-face exercises. There are several reasons for this:

- Although the distance aspect of distance tutoring changes one key component of the tutor/student relationship, most other aspects remain constant. Therefore, activities that are well suited to face-to-face tutoring are likely to be adaptable to the distant environment.
- All tutors are trained in face-to-face activities. Minimal retraining is required if existing activities are reused.
- Tutors are not educational professionals and do not have a great deal of time for training in distance education methodologies.
- Students and tutors often combine face-to-face and distance tutoring;
 mixing methods could cause confusion.
- Most literacy organizations have extensive holdings of face-to-face resources such as workbooks, textbooks, study guides, and so on. Few agencies have extensive distance learning resources.

The activities discussed in this handbook should not be viewed as either comprehensive or all-inclusive; rather, they are intended to be illustrative of the types of face-to-face exercises that can be adapted to the distance learning environment. Further, the activities that are discussed are only ones that can be conducted entirely at a distance. If the tutor and student alternate between face-to-face and distance tutoring sessions, this expands the variety of activities that they can use.

Organization of this Handbook

This handbook discusses distance tutoring under the following headings:

Characteristics of communications technologies;

- Distance tutoring activities;
- Planning distance tutoring; and
- Preparing for distance tutoring.

The handbook also contains an extensive reference list and a number of proformas to assist in planning and conducting distance tutoring.

Part 2 - Characteristics of Communications Technologies

Introduction

Every communications technology has its own strengths and limitations. This part of the handbook discusses the characteristics of the telephone and TDD.

The Telephone

The telephone is a proven technology that has been used for educational purposes almost since its invention over a century ago. Proven advantages of the telephone over other communications technologies include the immediacy of communication, the widespread availability of these devices, and low cost. Telephone tutoring is also flexible and can be provided one-to-one, one to a group at a distance using a speakerphone, and one to many locations using teleconferencing. Telephone tutoring also has a variety of limitations, including:



- lack of visual cues of both the communicant and his or her context (office, home, classroom, and so on.);
- it can take several calls to establish contact; and
- tutors and students may be reluctant to initiate calls because they don't want to intrude.

One of the major advantages of telephone tutoring over other types of technological assistance is the motivation that it can provide to both the tutor and student. Studies have shown that students who receive calls from tutors feel that their tutors are interested in their studies; that telephone calls are very encouraging; that telephone calls make it easier for students to cope with difficulties; that telephone tutoring decreases the sense of isolation experienced by some students; and that telephone conversations stimulate tutors as well as students.

While many face-to-face tutoring activities can be adapted for telephone tutoring, some activities such as written dialogue and responding in writing to oral instructions are clearly impossible. The use of a common set of visual study

materials including workbooks, photographs, videotapes, computer disks, and World Wide Web pages can partially compensate for this limitation. Caution must be exercised, however, as over-reliance on pre-arranged materials can limit spontaneity, one of the strengths of individualized instruction.

The TDD

The TDD traces its origins to an earlier technology, the teleprinter. **Teleprinters** were desk sized. electromechanical typewriters which when linked together by either connecting wires or radio signals enabled what was typed on one machine to be typed simultaneously on other connected machines. Commonly referred to by their manufacturer's Teletype name. the Company, these machines were used almost exclusively bv telegraph companies, the military, news services and big businesses.



In the early 1960s, the acoustic couple was invented, enabling TTY machines to connect to each other over normal telephone lines. To enable communications, it was originally necessary to place a telephone handset into a special cradle on a couple, which was attached to the TTY. Later, the couple was integrated with the keyboard and printer, and the first true *TDD* was created. Today, most TDDs connect directly to the telephone system without the need to cradle a handset; the acoustic couple is used only used to connect through pay telephones, digital telephone systems, and telephone systems with non-standard line voltages. Of note, while there are important differences between TTYs and TDDs, many people still use the terms interchangeably.

A modern TDD is approximately the size of a small laptop computer. Standard features include a PC-style keyboard to enter messages, and a liquid crystal display (LCD) to display one or two lines of text. Some models also incorporate a built in printer so that messages can be printed and saved, while others allow external printers to be attached. If a speakerphone is not incorporated in the device, provision is made for the attachment of a telephone to enable audio as well as text communications. Advanced features found on telephones like voice and text messaging are also found on many models.

Individuals equipped with a TDD are able to communicate in a variety of different ways:

- Voice-to-Voice. Communicants can speak to each other using the built in speakerphone or attached telephone as they would with a normal telephone.
- Text-to-Text. If both communicants are equipped with a TDD, communication can be entirely text-to-text. Information typed on one machine simultaneously appears on the other device.
- Text-to-Voice/Voice-to-Text. If one of the communicants is not equipped with a TDD, communications can be conducted either text to voice or voice to text through a relay operator. A relay operator equipped with a telephone headset and TDD converts the message from text to voice or voice to text as necessary. This facility is not normally used for literacy tutoring purposes.
- Voice Carry Over (VCO). One person can speak and read while the other listens and types. This facility is used when one of the communicants is speech impaired or hearing impaired, but not both.

The TDD shares many of the same attributes as the telephone. These include:

- Low Cost. TDDs are relatively inexpensive to both own and operate. A full-featured model incorporating messaging, a speakerphone, and a printer costs less than \$ 700. Moreover, there are no additional costs for software or Internet fees; all that is required is regular telephone service.
- Simplicity of Operation. Individuals can learn to use a TDD with minimal instruction. Further, minimal literacy and technical ability is required; there is no need to be able to read drop-down menus or complex *Help* files.
- Flexibility. TDDs can be connected together over telephone lines, using cell phones, or in a classroom setting using a telephone line simulator device (TLSD). This allows TDDs to be used either for distance education, or as a supplement to face-to-face instruction.
- Portability. TDDs are designed to be portable and can be moved and easily set up by someone with minimal training.
- Availability of Training. Extensive instructional materials are available on operation of TDDs, some of which are suitable for use by those with only limited literacy skills. These materials include not only paper based resources, but videocassettes and DVDs as well.

Because of these attributes, and in particular because of the ability of the TDD to support both text and voice communications simultaneously, the TDD can be used to support more learning activities than the telephone alone. These activities will be discussed in the next part of this handbook.

Part 3 - Distance Tutoring Activities

This part of the handbook presents a variety of different tutoring activities that can be used in distance tutoring. These activities are presented according to the type of communication used in the activity. Three types of activities are presented:

- Voice-only activities;
- Text-only activities; and
- Voice and text activities.

The final section of this part discusses how group activities can be conducted.

Voice-Only Activities

General

A variety of voice-only activities can be used in distance tutoring. Voice-only or *telephone tutoring* is, by its nature, well suited for activities that are based upon reading, either by the student or the tutor. As such, these activities can be particularly useful for auditory learners. Further, because these exercises do not need any special equipment, they can be conducted easily on an impromptu basis, such as when a regular face-to-face class must be cancelled.



Oral Spelling Activities

One of the simplest telephone tutoring activities is oral spelling. The tutor asks the student to spell out words, much as he or she would in a tutorial room, and the student responds. Oral spelling exercises are particularly well suited to auditory learners.

Oral spelling over the telephone can be complicated by the lack of context and the sometimes poor line quality. Therefore, when doing oral spelling activities, it's important to:

- clearly say the word;
- use the word in context; and then

say the word again.

The student should be instructed to respond by:

- saying the word;
- spelling the word; and
- saying the word again.

Example 1 - Oral Spelling Exercise

Tutor: Okay John, we are going to start off with a spelling review. All the words will be from Challenger 1, Lesson 3 that I asked you to study last time. I'll give you a word; then you repeat it for me and spell it. Please try to answer without checking the book. Are you ready?

Student: Sure.

Tutor: Okay. Let's go. First word: "Lake" "I went swimming in the lake." "Lake."

Student: lake. I - a - k - e. lake.

Tutor: Good. Next word. ...

If there is difficulty understanding the student because of poor line quality, a heavy accent, or a speech impediment, it may be necessary for the student to use the International Phonetic Alphabet. See Appendix F.

This type of exercise can also be used for basic numeracy skills. For example, the tutor could ask the student to respond to arithmetic table questions such as, "What's 7 X 8?"

Fill-in-the-Blank Activities

Many workbooks contain fill-in-the-blank activities. These too can be adapted to telephone tutoring.

¹ Murphy, C. (1985). Challenger 1. Syracuse, NY: New Readers Press.

Example 2 - Fill-in-the-Blank Exercise

Tutor: Ok Steven, I would like you to turn to Challenger 1, Page 11, Activity 1 - Read and Write. Let me know when you've got it.

Student: Okay, I've got it.

Tutor: Good. We are going to do this exercise together. I'll read the words and you fill in the blanks using the correct words from the list on the left of the page. When you fill in the blank, say the correct word then spell it for me. I'll do the first one for you. "Question 1. Dave got mad m-a-d when he saw the mud m-u-d on his jeep." Okay?

Student: I think so.

Tutor: Don't worry. It will become clearer once we've done one or two questions.

Student: Okay.

Tutor. Good, let's go, "Question 2. When it is time...

Note that it is very important to give the student sufficient time to not only find the exercise, but orient himself or herself to it. Similarly, it's best for the tutor to work through one or two examples so the student understands exactly what's expected.

Duet Reading Activities

Duet reading can be done over the telephone as well as face-to-face. One obvious limitation is, however, that the tutor cannot move his or her finger along the text as he or she would in a face-to-face setting to establish the cadence. To compensate for this, the tutor can start off by reading a paragraph or two at the desired cadence, then have the student join in. Duet reading is illustrated in Example 3.

² Murphy, C. (1985). Challenger 1. Syracuse, NY: New Readers Press.

Example 3 - Duet Reading Exercise

Tutor: Okay Sara, let's try some duet reading. Do you have your copy of *Hush Little Baby* handy?

Student: Yes, I have it here.

Tutor: Good. I think we finished last time at the bottom of page 9, so turn to page 10. It starts, "The baby is crying harder."

Student: Got it.

Tutor: Good. I'll begin and read several lines to set the cadence. When you hear this tone [*The tutor pushes a button on the telephone.*], join in and we will read on from there together. I'll be reading quite quickly so try and keep up. We'll read a page or two before stopping. Okay Sara?

Student: Okay.

Tutor: Here goes, then.

The baby is crying harder. People are looking at him. They are looking at Pam.

"It's too cold in here for a baby," an old man tells her. "Don't you have a hat for him? Don't you have a blanket?"

"Yes," Pam says. "But he was too hot."

The old man shakes his head.

The tutor pushes a telephone button and a tone is heard

Tutor and Student: Pam forgets the meat and milk and ...

As in a face-to-face setting, if the student falls behind, it may be necessary to stop then restart the exercise.

³ Frommer, S.H. (1990). Hush Little Baby. Syracuse, NY: New Readers Press.

Text Revision Activities

Revising text is a difficult task for many students and one that frequently requires the assistance of a tutor. Text revision exercises can be complex but still can be conducted over the telephone.

Example 4 – Text Revision Exercise

Tutor: Angus, do you have your copy of *Lessons in Writing Sentences* handy?

Student: Aye, Art. I have it here.

Tutor: Okay, would you please turn to Page 41, Exercise 28.

Student: Okay. I've got it here.

Tutor: Good. Can you read me the directions?

Student: Aye. "Read each of the sentences carefully. Then put them together to form a single sentence. Some will have a compound subject. Some will have a compound verb. Some will have both."

Tutor: Very good. Any questions?

Student: No. I don't think so.

Tutor: Okay then. Lets look at question 2. Why don't you read it to

me?

Student: Question 2. "Bill ordered pizza. Frank ordered pizza."

Tutor: Good. Now then, what words are the same in both sentences?

Student: "ordered pizza?"

Tutor: Excellent! And which are different?

Student: The first one starts with "Bill," and the second one starts with "Frank."

Tutor: Very good. Can you see then how you could combine the sentences into one sentence?

Example 4 - Text Revision Exercise (continued)

Student: I think so. "Bill and Frank ordered pizza."

Tutor: Absolutely! Well done. Next question ...

4

Text-Only Activities

Just as telephones can be used to support voice-only tutoring, so too can TDDs be used to support text-only activities. TDD activities like telephone activities are largely based on face-to-face exercises. Text-only activities can be particularly useful for visual learners. Prior to using the TDD in lessons, the tutor and student should become familiar with the standard TTY/TDD abbreviations, which are found at Appendix E.



TDD Terminology

In the examples that follow, two abbreviations are used extensively.

GA is used to indicate that the party has finished typing and the other person can *Go Ahead*.

SK indicates that the party is set to end the conversation - *Stop Keying.*

Details on the use of these and other TDD abbreviations can be found in Appendix E.

Word Dominos

Word Dominos is a simple game that can be used to exercise spelling and vocabulary skills. One communicant types a word, and the other communicant responds with a word that starts with a designated letter in the word – normally but not always the last letter.

Word Dominos can be modified easily to meet the specific learning needs of participants. For example, acceptable words might be limited to specific parts of speech — verbs, nouns, adjectives, adverbs, and so on. Similarly, the difficulty of the game can be adjusted by setting the minimum number of letters or syllables of words or by setting a time

limit.

⁴ Moore, G.N, and Woodruff, G.W. (1992). Lessons in Writing Sentences. North Billerica, MA: Curriculum Associates,

Word dominos is a good activity to introduce students to TDD tutoring and can also be used as an icebreaker when doing face-to-face tutoring with a group using TDDs. When played with a group, one or more students can be assigned to each TDD, and the tutor can act as the referee/arbitrator.

Example 5 – Word Dominos Exercise

Tutor (on telephone): Ruth, do you remember when we played Word Domino last?

Student (on telephone): Oh. I think it was two or three weeks ago.

Tutor (on telephone): I think you're right. You did really well last time so why don't we make it a little more challenging this time. How about if all words have at least two syllables?

Student (on telephone): Okay. Let's give it a try.

Tutor (on telephone): Great! How about you start off?

Student (on telephone): Okay. I've got a word.

Tutor (on telephone): Okay. Switch on your TDD, hang up the phone, and start when you want to.

Student (on telephone): Okay.

The tutor and student turn on their TDDs and hang up their telephones.

Student (on TDD): RELAX GA

Tutor (on TDD): X. OH NO! XENON GA

Student (on TDD): N. NEIGHBOUR GA

Tutor (on TDD): R. ROBOT ...

Modification Activities

Modification activities entail the tutor providing the student with a word, and the student modifying that word in a prescribed manner. For example, the tutor might provide an adjective and have the student respond with the corresponding adverb. The possibilities of this type of exercise are almost endless: singular to plural form, present to past tense, male to female, and so on.

While modification activities can be conducted using only TDDs, it is preferable to begin the activity on the telephone. This allows the tutor and student to discuss the activity and the governing spelling / grammatical rules first. This discussion can be done on the TDD, but it is more tiring and time consuming than if carried out on the telephone.

Example 6 – Modification Exercise

Tutor (on telephone): Okay Ali, let's have a look at adjectives and adverbs again. Do you recall what an adjective is?

Student (on telephone): Yes. An adjective is a word

A brief discussion on adjectives and adverbs ensues.

Tutor (on telephone): Good. Let's try a little exercise then. I'll type an adjective on the TDD, and you respond by typing the corresponding adverb. For example if I typed slow, S - L - O - W, you would type slowly, S - L - O - W - L - Y.

Student (on telephone): Okay. That sounds simple enough.

Tutor (on telephone): Good! When you're ready, switch on your TDD; hang up the phone; and send me a GA.

Student (on telephone): Okay.

The tutor and student turn on their TDDs and hang up their telephones.

Student (on TDD): GA

Tutor (on TDD): QUICK GA

Student (on TDD): QUICKLY GA

Tutor (on TDD): EXCELLENT! NEXT WORD - GROSS GA

Dictionary Activities

Dictionary work is frequently used in face-to-face tutoring to build both reading comprehension and spelling skills. Students are provided with a selection of words and asked to look up their definitions in a dictionary. Dictionary work can also serve as the basis for several TDD exercises.

Several types of definition and dictionary exercises are possible: (1) when provided with a definition, the student may be asked to type the correct word

from a list of words that they have previously been asked to study; (2) the student may be asked to correctly use a proffered word in a sentence; and (3) the student may be asked to type the definition of a word. Caution must be exercised with this final type of exercise because unless the student has a vocabulary strong enough to properly define words, the exercise can be very frustrating. This is particularly the case when working at a distance because non-verbal cues inherent in face-to-face tutoring are absent.

Example 7 – Dictionary Exercise – Type 1

Tutor (on telephone): Okay Amanda. Are you ready for the definitions?

Student (on telephone): Sure. I've got the word list here. Let's go.

Tutor (on telephone): Okay. Switch on your TDD, hang up the phone, and give me a GA.

Student (on telephone): Okay.

The tutor and student turn on their TDDs and hang up their telephones.

Student (on TDD): GA

Tutor (on TDD): THIS IS WHERE BEARS LIVE. GA

Student (on TDD): WILDERNESS GA

Tutor (on TDD): GOOD. WATER FLOWS OVER THIS. GA

Student (on TDD): WATERFAL GA

Tutor (on TDD): CHECK SPELLING GA

Student (on TDD): WATERFALL GA

Tutor (on TDD): GOOD. FOR THIS ONE, FILL IN THE BLANK. THE WOMAN PUSHED THE WINDOW OPEN GA

Student (on TDD): WIDE GA

Tutor (on TDD): EXCELLENT. I DO THIS ...

Note that the tutor should identify any errors that the student makes and ask him or her to correct them at that point. Bearing in mind that this is an

exercise and not a test, this is normally preferable to reviewing all errors at the end.

Definition activities can be conducted in a classroom setting by groups of students who have studied the same words. The activity can be conducted as a round robin, or even as a game. As in other group activities, it is ideal if each student has his or her own TDD.

Example 8 – Dictionary Exercise – Type 2

Tutor (on telephone): Okay, Amanda, now what I would like you to do is use the word that I provide you in a sentence. For example, if I typed, "dog" you might type, "The dog bit the man." Is this clear?

Student: Sure. We did this last week.

Tutor (on telephone): Okay. Switch on your TDD, hang up the phone, and give me a GA.

The tutor and student turn on their TDDs and hang up their telephones.

Student (on TDD): GA

Tutor (on TDD): GOOD. FIRST WORD – CANVAS. GA

Student (on TDD): THE TENT IS MADE OF CANVAS. GA

Tutor (on TDD): GOOD. CANVASS. GA

Student (on TDD): HE WILL CANVASS BEFORE THE VOTE. GA

Tutor (on TDD): EXCELLENT. NEXT WORD ...

One of the advantages of using the TDD for definition work is that, because words are typed, it is possible to differentiate between homophones (for example: canvas and canvass). It is also normally much easier and faster to type the word using the TDD than to say and spell the word on the telephone, have the student copy it down, then read it back in a sentence. An ancillary benefit is that by using the TDD, the tutor is also able to check punctuation and the spelling and usage of contextual words. This enables the tutor to better focus future instruction.

Written Dialogue

Written dialogue is exactly as the name implies, conversing in writing – the tutor and student "talk" to each other using only the TDD. The dialogue can be open ended, for example discussing the day's events; or focussed, for example, discussing a short story. Because the intent of written dialogue is to encourage writing, a degree of grammatical and spelling latitude is normally exercised in such exercises.

Example 9 – Written Dialogue Exercice

Tutor: HI JOHN. HOW ARE YOU DOING? GA

Student: FINE KAREN. YOU? GA

Tutor: GREAT. WHAT DID YOU DO LAST NIGHT? GA

Student: WATCHED THE RAPTORS GAME. GA

Tutor: HOW DID THEY PLAY? GA

Student: PRETTY GOOD BUT LOST AGAIN GA

Tutor: WHY DID THEY LOSE? GA

Student: TOO MANY ENJURIES. ALL THEIR BEST PLAYERS

ARE OUT. GA

Tutor: WHAT DO THEY NEED TO DO TO REACH THE

FINALS? GA

STUDENT: BUILD THEIR DEFENCE. ITS TERRIBLE. GA

Tutor: WHAT DO YOU THINK THEIR CHANCES ARE? GA

Student: WELL LET ME TELL YOU ...

Note that the tutor can encourage the student to write complex thoughts by asking open-ended questions that cannot be answered with one-word answers. Questions that start with **why** and **how**, as well as **what if** and **what do you think** often elicit longer responses.

Although the tutor and student should not focus on spelling and grammar during written dialogue, this does not stop the tutor from noting where additional

work will be needed in the future. TDD printouts can be particularly useful in this regard as they provide a written record of the conversation. This information can be invaluable when planning future lessons.

Writing Tag

Writing tag is a simple activity that can be fun for both the student and the tutor. Essentially, it is the old game of one person starting a story and the other person having to carry it on. Like written dialogue, the intent of this activity is not necessarily to exercise spelling and grammar skills, but to build writing confidence and volume. Similarly to written dialogue though, the results of the activity can be analysed and saved for future reference.

Setting up for writing tag is normally done in VCO mode using the telephone handset. The telephone can also be used during the exercise to encourage the student if they have a writing block. Example 10 illustrates how a game of writing tag might be set up.

Example 10 - Writing Tag Exercise

Tutor (on telephone): Philip, what do you think about a little game of writing tag?

Student (on telephone): Oh no! That's too hard. I can never find the right words.

Tutor (on telephone): But that's why we do it. It's great for learning to write ideas.

Student (on telephone): Okay. If you say so. Let's give it a try.

Tutor (on telephone): Great! Do you want to start or do you want me to?

Student (on telephone): I'll start. You did last time.

Tutor (on telephone): Okay. Switch on your TDD, hang up the phone, and start when you want to.

Student (on telephone): Okay.

The tutor and student turn on their TDDs and hang up their telephones.

Student (on TDD): THERE ONCE WAS A TUTOR WHO MADE HIS STUDENT DO WORK THAT HE DIDN'T WANT TO. GA

Example 10 – Writing Tag Exercise (continued)

Tutor (on TDD): THE TUTOR REALLY THOUGHT THAT HE WAS DOING THE BEST FOR HIS STUDENT. GA

Student (on TDD): WHAT THE TUTOR DIDN'T KNOW ...

If the student or tutor wishes to talk on the telephone, he or she can signal the request by typing **SK PU** (Stop Keying, Pick Up). His or her partner then knows that he or she should pick up the handset for a conversation. The TDD is left turned on during the conversation.

Writing tag can also be conducted as a group activity. Three or more TDDs can be set up in a classroom and shared by a number of students as illustrated in Appendix C. Alternately, two groups of students can be set up in adjoining rooms or even different locations, and the two groups can collaboratively write the story – each group using a designated typist. The possibilities are almost endless.

20 Questions

The game of 20 questions is known to almost everyone. One person picks a person, place or thing, and the other person has to identify the subject using up to 20 Yes/No questions. Playing the game using a TDD is a good way to develop both analytical and question writing skills.

As with *Writing Tag*, *20 Questions* is best set-up in VCO mode, and played in TDD mode.

Example 11 – 20 Questions

Tutor (on telephone): Susan, how about a game of 20 questions on the TDD?

Student (on telephone): Okay! That's always fun.

Tutor (on telephone): Okay. How about you pick a person, place or thing, and I'll ask the questions. Then we can change around.

Student (on telephone): Sounds good to me.

Tutor (on telephone): Have you got a person place or thing picked out?

Example 11 – 20 Questions (continued)

Student (on telephone): Yep. I'm ready.

Tutor (on telephone): Okay. Switch on your TDD, hang up the phone, and I'll ask the first question. Signal GA when you are ready.

Student (on telephone): Okay.

The tutor and student turn on their TDDs and hang up their telephones

Student (on TDD): GA

Tutor (on TDD): IS IT A PERSON? GA

Student (on TDD): NO. GA

While the objective of 20 Questions is to get the student to write questions, it is sometimes useful for the tutor to be the questioner first. In addition to serving as a guide and primer for the student, reversing roles can reinforce the equity of the tutor/student relationship. i.e. Both the tutor and student have equal chances of both winning and losing the game.

Voice and Text Activities



In the preceding section, it was illustrated how activities can be set-up using the telephone, then conducted in full text mode using TDDs. It is also possible to conduct entire activities in VCO mode with one person speaking and reading while the other writes and listens. In this section, a variety of VCO activities are described. Two general types of activities are illustrated:

- Oral Response Exercises wherein the student responds orally on the telephone to a written prompt from the tutor using the TDD; and
- Written Response Exercises wherein the student responds in writing using the TDD to an oral prompt from the tutor on the telephone.

It should be noted that both types of exercises are easier to conduct if the tutor and student are equipped with headsets or speakerphones. This allows the tutor and student to both talk and listen while typing. If only a standard telephone is available, the tutor and student should pick up the handset for oral dialogue

after each typed **GA**. The tutor and student should avoid trying to hold the telephone with one hand while typing with the other; this is just too awkward – it just doesn't work!

It is assumed in all the following exercises that telephone/TDD communications have already been initiated and confirmed. This could be done as follows:

Initiating VCO Communications

Tutor (on telephone): Okay. Are you ready to move on to some writing activities?

Student (on telephone): Sure.

Tutor (on telephone): Good. I would like you to turn on your TDD, wait about five seconds, and then send me a **GA**. You can put down the phone, but don't hang it up. When you see me send **SK PU** (Stop Keying, Pick Up), pick up the handset and we'll start the activity.

Student (on telephone): Good.

The tutor and student turn on their TDDs.

Student (on TDD after five seconds): GA

Tutor (on TDD): SK PU

The tutor and student pick up their handsets.

Tutor (on telephone): Excellent. The TDDs are working, so lets move on to ...

Phonics Exercises

Phonics exercises are often undertaken when students first begin literacy instruction. These exercises can be conducted in VCO mode with the tutor typing and listening and the student speaking. Example 12 illustrates a basic phonics exercise.

Example 12 - Basic Phonics Exercise

Tutor (on Telephone): Suzanne, if it's okay with you, can we now review some phonics?

Student (on telephone): Okay.

Tutor (on telephone): Good. Would you please turn on your TDD and send me a GA when you're ready.

Student (on telephone): Okay.

Student (on TDD): GA

Tutor (on telephone): Good. Suzanne, what I'm going to do is type a consonant blend or digraph on the TDD. What I want you to do is tell me the letters that you see, pronounce them as you would read them, and give me an example of a word that uses the combination. For example, if you saw *SH*, you would say, "S – H. The sound is shh. A word is *fish*." Does that make sense?

Student (on telephone): Sure.

Tutor (on telephone): Good. Watch your TDD.

Tutor (on TDD): CH GA

Student (on telephone): C – H. The sound is chh. A word is chug.

Tutor (on telephone): Excellent. Next one.

Tutor (on TDD): CL GA

Student (on telephone): C - L. The sound is ...

In this example, the student responds only orally. A slightly more advanced version of this activity has the student then type examples using his or her TDD.

Example 13 – Advanced Phonics Exercise

Student (on telephone): C - L. The sound is cl. A word is clap.

Tutor (on telephone): Very good. Okay Suzanne, using your TDD would you please type me three examples of words with the CL consonant blend.

Student (on telephone): Okay.

Student (on TDD): CLAMP CLAW CLOWN GA

Tutor (on telephone): Excellent. Watch your TDD for the next combination...

Written Spelling Activities

In Example 1, it was illustrated how spelling exercises can be conducted orally over the telephone. This type of exercise can also be conducted in VCO mode with the student responding in writing to oral prompts from the tutor. Written spelling exercises reinforce spelling skills and may be preferable for some students, particularly visual learners.

Example 14 – Written Spelling Exercise

Tutor (on telephone): Okay Hillary, we are going to start off with a spelling review. All the words will be from Challenger 1, Lesson 3 that I asked you to study last time. I'll give you a word, and you type your response on the TDD. Signal GA when you've finished spelling each word. Please try to answer without checking the book. Are you ready?

Student (on telephone): Sure.

Tutor (on telephone): Okay. Switch on your TDD and give me a GA when you're ready.

Student (on TDD): GA

Tutor (on telephone): Okay. Let's go. First word: "Lake" "I went swimming in the *lake*." "Lake."

5

⁵ Murphy, C. (1985). Challenger 1. Syracuse, NY: New Readers Press.

Example 14 – Written Spelling Exercise (continued)

Student (on TDD): LAKE GA

Tutor (on telephone): Good. Next word. ...

Short Answer Activities

A variety of different types of short answer activites can also be conducted in VCO mode. The short answers can be in response to questions in a workbook, or be impromptu questions placed by the tutor.

Example 15 – Short Answer Exercise Based on a Workbook

Tutor (on telephone): Okay Eduardo. I think we'll move on to a writing exercise now. Do you have *Challenger 5* with you?

Student (on telephone): Sí. I have it here.

Tutor (on telephone): Good. I would like you to turn to page 42, Section 2. The title is *About the Story*.

Student (on telephone): It is here, Señora.

Tutor (on telephone): Good. Let's start with Question 2. I'll read the question, and you type your answer. Okay?

Student (on telephone): That is good.

Tutor (on telephone): Okay. Turn on your TDD and give me a GA when you are ready.

Student (on TDD): GA

Tutor (on telephone): Good. Question 2. Describe the "oldest trick in the world." Take your time. Begin when you're ready.

Student (on TDD): "THE OLDEST TRICK IN THE WORLD," IS WHEN ...

6

⁶ Murphy, C. (1985). Challenger 5. Syracuse, NY: New Readers Press.

Example 16 - Impromptu Short Answer Exercise

Tutor (on telephone): Fine Amanda. What do you think of working on writing skills for a while?

Student (on telephone): Ah! I never know where to begin.

Tutor (on telephone): Okay, then how about I read you the start of a sentence, and you finish it?

Student (on telephone): Okay I guess.

Tutor (on telephone): Good. Let's use the story in Challenger 3, Lesson 5.

Student (on telephone): Okay.

Tutor (on telephone): Okay. Turn on your TDD and give me a GA when you're ready.

Student (on TDD): GA

Tutor (on telephone): Good. Let's begin, [read slowly] "I know Ginger was thrifty because," "I know Ginger was thrifty because ..." GO AHEAD

Student (on TDD): SHE WOULD NOT BUY THINGS FOR HER APARTMENT. GA

Tutor (on telephone): Excellent! Let's try another one. "I think Ginger doesn't spend much money because ..."

As illustrated in this example, when providing verbal prompts for a written response, it's useful to provide the verbal prompt at least twice. This not only ensures that the student understands the prompt, it provides him or her with time to begin to think about an answer. In some instances, it may also be necessary to provide a typed prompt on the TDD in addition to the oral prompt on the telephone. The format used will be determined by the capabilities and needs of the particular student.

Revision Activities

Example 4 illustrated a revision exercise conducted over the telephone. Having the student follow-up his or her oral response with a written response can

7

⁷ Murphy, C. (1985). Challenger 3. Syracuse, NY: New Readers Press.

reinforce these types of exercises. If the student's TDD is equipped with a printer, an added benefit of typing the exercise is that the student then creates a permanent record for future reference.

Example 17 – Typed Revision Exercise (continued from Example 4)

Tutor (on telephone): Absolutely! Well done! Now I'd like you to type that out using the TDD. Make sure your printer is turned on.

Student (on telephone): Okay.

Student (on TDD): BILL AND FRANK ORDERED PIZA. GA

Tutor (on telephone): Good, but check the spelling of *pizza* and retype it for me.

Student (on TDD): PIZZA GA

Tutor (on telephone): Excellent. Let's try question 3...

As illustrated in this example, having the student type out his or her response may identify problems that might not be apparent if the student only reads his or her answer.

Message Taking Activities

One skill that is commonly required in the workplace is taking down telephone messages. This skill can be practiced in VCO mode with the tutor leaving the message, and the student taking it down using the TDD.

Example 18 – Message Taking Exercise

Tutor (on telephone): Burt, How about we practice taking down messages again. We did this a week or two ago and it went pretty well.

Student (on telephone): Oh ya. I remember. Okay.

Tutor (on telephone): Okay, then. I'll read you the message and you take it down, typing it on the TDD. I won't comment on your message until we are done the practice. How about for the first practice you play a clerk in the parts department at Canadian Tire. **Student** (on telephone): Canadian Tire! Why not the Mercedes dealership? I love Mercedes!

Tutor (on telephone): Okay! Mercedes it is then. When you hear this tone [The tutor pushes a telephone button.], this means that your telephone is ringing. You should then answer the phone as if you are at the parts counter. Okay?

Student (on telephone): Sure. I'm ready to go.

Tutor (on telephone): Excellent. Stand bye.

The tutor pushes a telephone button.

Student (on telephone): Hello, Parts Department.

Tutor (on telephone): Oh, Hi Burt. This is Joanne. Is Tony there?

Student (on telephone): Sorry Jo, He's out this morning. Can I help?

Tutor (on telephone): Thanks Burt, would you take a message for me.

Student (on telephone): Sure

Tutor (on telephone): The 23056B starter that Tony needs is back ordered.

Student on TDD: 23056B STARTER TONY WANTS BACK ORDERED. GA

Example 18 – Message Taking Exercise (continued)

Student (on telephone): Go ahead.

Tutor (on telephone): It should be in Wednesday before noon.

Student (on TDD): IN WEDNESDAY BEFORE NOON. GA

Student (on telephone): Go ahead.

Tutor (on Telephone): I'll call if it will be any later.

Student (on TDD): WILL CALL IF ANY LATER. GA

Student (on telephone): Good.

Tutor (on Telephone): One last thing. I have a new telephone number – 723-9285.

Student (on TDD): NEW TELEPHONE NUMBER 723-9285. GA

Student (on Telephone): Gotcha. 723-9285.

Tutor (on Telephone): Thanks Burt.

Student (on Telephone): Okay Jo. I'll pass on the message. Bye.

As will be noted from the example, the general format of the telephone message exercise is:

- The tutor reads the message on the telephone;
- The student types the message on the TDD; and
- The student gives "GA" on TDD and verbal "Go ahead" on the telephone.

It should be noted that the intent of the telephone message exercise is to have the student take down the *gist* of the message, not to prepare a word for word transcript. As indicated in the dialogue, it's often best to save comments until the whole message has been taken down so as not to interrupt the student's train of thought.

Group Activities

Many of the activities presented in this chapter can be modified for use with small groups. Group members may be in a single classroom, in adjoining rooms, or at a distance.

Group activities using the TDD require special attention because of the technical characteristics of the device. In particular, because what is typed on one TDD appears on all machines simultaneously, and because it is impossible to know who is speaking unless that individual identifies himself or herself, it is important that clearly understood procedures be established for the conduct of activities. In particular, it is important that each participant knows how to identify himself or herself to other participants, and who will control the flow of the activity. One method of doing this is presented below.

It is recommended that group activities be initiated in telephone mode and instructions for the activity be given orally. This can be done in a telephone conference call if necessary. Once instructions have been given and questions answered, the participants then can switch to VCO or text mode as required.

When the participants are being briefed on the activity, they must be advised how they will identify themselves during the activity. Two options are available: (1) participants can use their own names, or (2) they can use an assigned a number. Using an assigned number takes a little practice, but, once the routine is learned, it speeds up the flow of conversation. No matter which system is used, participants must be instructed that everyone must begin every message with their identifier so that other group members know who is talking, e.g., "JOHN. I AGREE WITH THAT," or "3. IT IS SPELT WITH AN X." Participants must also be advised that when asking questions, they must clearly identify who it is that is being questioned, e.g., "9. MARY, WHAT VOWEL COMBINATIONS COULD BE USED TO CREATE A LONG E SOUND?"

Example 19 illustrates the setup of a group activity. It is assumed in this example that the group members are already connected in a conference call.

Example 19 - Group Activity

Tutor (on Telephone): Okay. Good. I think we have everyone. As we discussed last time we are going to carry on with dictionary work today. Before we start though, lets review how this is going to work. John, you are 1, Sue you are 2 and Korrina, you are 3. I will be 9. So far so good?

John (on telephone): Sure.

Sue (on telephone): Fine.

Korrina (on telephone): I think so (hesitantly). How's it going to work?

Tutor (on telephone): Good question. I will type a definition on the TDD. You will check your word list for the right word. When you find it, hit your number, then GA. I will then signal one of you to type your word by typing my number then your number then GA. For example, if I want you to respond Korrina, I will type **5 3 GA**. You would then respond by typing your number, **3**, then **the word**, then **GA**. Is that clear?

Korrina (on telephone): Okay. I type 3, the word, then GA.

Tutor (on telephone): Exactly.

John (on telephone): What if I want to talk to Sue?

Sue (on telephone): Not likely!

Tutor (on telephone): Now-now! If you want to talk to each other, just start off with the name of the person you want to reply. For example, John, if you want Sue to give you a hand, just type **Sue, can you help? GA.** Sue, you would then respond. Clear as mud?

John (on telephone): Sure.

Tutor (on telephone): One final point. If I want you to pick up the handset for further instructions, I will type **SK PU**. Okay?

John, Sue, Korrina (together on telephone): Fine. Let's do it!

Tutor (on Telephone): Good. Then I think we are ready to go. Everyone switch on their TDD, type your number then hit GA. When you see my 5 GA, hang up your telephone. Switch on now.

Example 19 – Group Activity (continued)

Everyone switches on their TDDs

John (on TDD): 1 GA

Sue (on TDD): 2 GA

Korrina (on TDD): 3 GA

Tutor (on TDD): 5 GA.

Everyone hangs up their telephone

Tutor (on TDD): 5 GOOD. EVERYONE SEND ME THERE NUMBER AND GA JUST TO CONFIRM WE HAVE EVERYONE. GA

John (on TDD): 1 GA

Sue (on TDD): 2 GA

Korrina (on TDD): 3 GA

Tutor (on TDD): 5. GOOD. FIRST DEFINITION. THIS PROVIDES

POWER TO A CAR ...GA

Sue (on TDD): 2 GA

John (on TDD): 1 GA

Korrina (on TDD): 3 GA

Tutor (on TDD): 5. 2 GA

Sue (on TDD): 2 ENGINE GA

Tutor (on TDD): 5. EXCELLENT SUE. NEXT WORD. THIS IS MIXED

Although this process may at first seem cumbersome, students will pick it up very quickly and normally will have no difficulties mastering it. If difficulties do arise, just signal the students to pick up their handsets then resolve the problem on the telephone.

Part 4 - Planning Distance Tutoring

Preliminary Considerations

Overview

Planning for distance tutoring is much like planning for other types of tutoring, but there are a number of additional factors to consider. These factors arise because of the increased interpersonal distance imposed by the technologies, the physical separation of the tutor and student, and the problems associated with working concurrently in two different work environments. Planning for distance tutoring must therefore be particularly thorough, or the experience can be very frustrating.

Technology Selection

If a tutor/student pair will only do distance tutoring occasionally, for example on "snow days," the telephone should be adequate for tutoring purposes. If distance tutoring will be conducted routinely, however, consideration should also be given to using a TDD. The written communications capability of the TDD complements the oral communications capability of the telephone, allowing the tutor/student pair to conduct at a distance most of the same activities that they would in the tutorial room. Conversely, without written communications, the amount that the student will be able to accomplish will be significantly constrained

Time

Telephone/TDD tutoring is more demanding and tiring than face-to-face tutoring. Therefore, instead of planning for sessions of equal duration to face-to-face tutoring, it's normally best to plan for two or more shorter sessions. It's recommended that the first few TDD/Telephone tutoring sessions last not more than half of the duration of a normal face-to-face session. Thus, if a tutor and student normally meet for one 90-minute session per week, they should plan initially on two forty-five minute sessions at a distance. Once they have completed several such sessions, they can adjust their duration upward or downward as necessary, based upon experience.

Confidentiality

Prior to initiating distance TDD tutoring, it is essential that the tutor and student identify all concerns that they have about confidentiality. Confidentiality issues are often associated with students, but they apply equally to tutors as well. Jointly, the tutor and student must develop a calling protocol that identifies the following information

- where the individual wants and does not want to be called;
- whether the individual is concerned about it being known that he or she is receiving or providing literacy instruction;
- whom telephone numbers may and may not be provided to;
- when calls should and should not be made:
- who messages may and may not be left with; and
- whether messages may or may not be left on messaging machines or services.

To assist in the development of a confidentiality protocol, a pro forma is attached as Appendix D.

In all instances, when placing calls and leaving messages, the tutor and student should err on the side of privacy and discretion. Information must never be divulged to anyone without the prior consent of his or her tutor/student partner.

Distractions

One of the main advantages of distance tutoring over face-to-face tutoring is that it can be conducted from home. Homes, however, can be full of distractions. To minimize this problem:

- Plan tutoring sessions for when neither the tutor nor the student will be distracted by other family members. Good times for tutoring are when children are in school; baby is in bed for the night; when spouses or partners are out (unless they care for the children while you work); and so on.
- Disable call-waiting on both telephone lines; instructions on how to do this are in the telephone book.
- Avoid trying to do other things while you are studying. Distance tutoring requires the tutor's and student's full attention and doesn't allow time for preparing meals, doing the laundry, and so on.

Home Study Area

Both the tutor and the student will have to set-up home study areas. While this may seem straight forward, it does require some planning.

A good study area will be big enough to set-up the telephone and TDD and lay out materials in an orderly manner. It will also provide easy access to textbooks, workbooks, and writing supplies and be near a telephone jack and electrical outlet. To the extent possible, the work area should also be free from distractions such as televisions, radios and outside noises.



<u>Figure 4-1</u>. A home study area should be quiet, free of distractions and provide sufficient space for study materials, TDD and telephone.

Telephone Selection

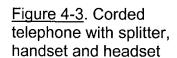
While almost any telephone can be used for telephone tutoring, some models work much better than others. If at all possible, try to use a telephone equipped with a hands-free headset. This type of telephone allows the caller to use his or her hands while talking. Hands-free telephones are also less tiring to use for extended periods than a standard telephone.

Two headset configurations are available. Many cordless telephones are equipped with a jack on the handset that allows a headset to be plugged directly into it (Figure 4-2). This setup can be particularly useful for Kinaesthetic tutors and learners because it allows the caller to move about while studying. Caution must be exercised, however, to ensure that the handset is fully charged before the tutoring session or communications can unexpectedly be lost.

Another alternative is to use a splitter device on a corded telephone (Figure 4-3). The splitter device plugs into the handset jack on the telephone, and a headset and the telephone's handset plug into it in turn. A selector switch on the splitter enables either the headset or handset. This configuration allows less movement than a cordless device, but is very reliable.



<u>Figure 4-2</u>. Cordless telephone with Headset





A good alternative to a headset is a speakerphone. Like a headset, a speakerphone frees up hands for writing or typing. A speakerphone also allows some freedom of movement, although the caller must be reasonably close to the microphone when speaking. Another advantage of a speakerphone is that it enables a



single tutor to support two or more learners at the same location.

A speakerphone must be positioned in a relatively quiet location where it can pick up the voice of the caller without undue background noise. Speakerphones should not be used if privacy is a concern or if use of the speaker will disrupt or disturb others (for example, annoy other family members or wake sleeping children).

If a standard telephone must be used, it should have a cord long enough to comfortably reach the work area. If a cordless device is used, care must be taken to ensure that it is fully charged before the tutoring session begins. When using a standard telephone it is also a good idea to periodically switch the handset from the left to the right ear to avoid arm, neck, and shoulder fatigue.

TDD Selection

Almost any TDD can be used for tutoring purposes; even basic models provide a good selection of features. Frequently, therefore, the most important criteria will be cost. The following features are desirable, although not essential, when selecting a TDD:

- A built in printer. This allows the student to record his or her work and save homework assignments and instructions from his or her tutor.
- An extended character display. Displays of 60 characters or more are preferable because they allow longer sentences to be displayed before words begin to scroll off.
- An integral telephone handset or speakerphone. This eliminates the need for a separate telephone to be connected to the TDD for voice communications.

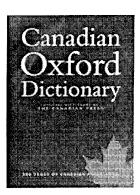
 Scroll back capability. Some models allow messages to be scrolled back. This is a useful capability because it allows the tutor and student to review longer passages and instructions before typing a reply.

Some models are also better than others for VCO communications. Therefore, if VCO communications will play a role in tutoring, a device optimized for VCO should be selected.

Study Materials

When distance tutoring is first being planned, it is important for the tutor and student to agree on a standard list of materials that each will have available for every tutoring session. Preparing this list avoids having to make detailed arrangements at the end of each tutoring session. This allows for the best use of valuable tutoring time. Items that should be considered include:

- pencils;
- a lined notepad;
- a dictionary (ideally the tutor and student should each have copies of the same dictionary); and
- agreed upon text books, workbooks, and reading materials.



To provide variety, the tutor and student might also agree to have on hand a publication like the previous day's newspaper, or an agreed upon magazine This allows the tutor and student to diverge from the standard study materials, and provides additional interest.

Lesson Planning and Coordination Cycle

Overview

To help plan for distance tutoring, it helps to view planning as a cycle that begins in one lesson and ends with conduct of the next lesson. The planning cycle can be broken down into in-lesson activities, post-lesson activities, and final details activities.

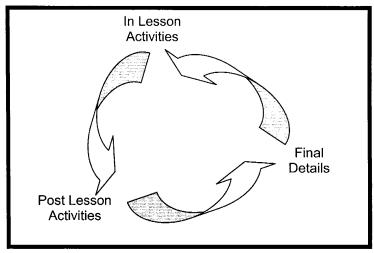


Figure 4-4. The Lesson Planning Cycle

To assist in the planning and conduct of each lesson, the tutor and student should each complete a *Study Record and Plan* (see Appendix A). The various sections of this document are completed at various points in the planning cycle as described below.

In Lesson Activities

At or before the beginning of each lesson, the tutor and student should each record on a *Study Record and Plan* the goal for the lesson. This goal is transcribed from the previous lesson's form. As the lesson progresses, the tutor and student complete the *Accomplishments* section, which serves as a permanent record of the progress being made. Homework that must be completed for the next lesson is recorded in the *Homework* block as it's negotiated. Finally, at the end of the lesson, the tutor and student identify what they wish to accomplish in the next lesson in the *Next Lesson's Goals* block. Negotiating goals is perhaps the most important step in the planning cycle as it determines what happens in all other steps. Ideally, the student should take the lead in establishing his or her learning goals, but the tutor may have to coach and assist him or her in this task, particularly early on.

After agreeing on goals, the tutor and student should confirm any special materials that will be needed for the next session. For example, it may be decided that each should have available a particular book, magazine or newspaper. The tutor and student must also confirm and record call details for the next session, including the date, time and telephone numbers.

If the tutor and student have TDDs equipped with printers, the tutor can confirm critical information on the Study Record and Plan by sending a TDD text message. An example of such a message is at Appendix B.

Post Lesson Activities

After the distance tutoring session has been completed, the tutor must review his or her notes and develop a detailed lesson plan for the next lesson, just as he or she would for a face-to-face tutoring session. Similarly, the student must review what he or she achieved in the lesson and what he or she would like to accomplish in the next session. The student might also identify additional issues that he or she would like to resolve while doing homework. If either the tutor or student needs to amend arrangements made for the next lesson, this must be communicated as soon as possible. When adjustments are required, the tutor and student must:

- Follow the confidentiality protocol when placing calls and leaving messages; and
- Allow sufficient time for the tutor/student to obtain the required resources and complete required preparations before the next tutoring session.

To enable proper planning, it is best to establish a routine for communicating the need for adjustments. For example, if a tutor and student meet every Thursday on the telephone, they might decide that any changes in the lesson plan should be communicated by Monday evening. If nothing is heard by then, both parties can then assume that the plan will be as previously discussed and agreed upon.

Final Details

Although not essential, a final details call is sometimes useful about 24 hours before the distance tutoring session. This is particularly the case if there have been no other communications between the tutor and student since the last tutoring session. Final details calls can be used to confirm call details (phone number, time and communications, mode), the learning materials that will be needed, and any other critical planning information. Final details calls also reinforce the tutor's interest in the student and encourage home study. Again, the confidentiality protocol must be adhered to when making such calls.

Part 5 – Transitioning to Distance Tutoring

Introduction

As previously indicated, both the tutor and student must be properly prepared for distance tutoring or the experience can be extremely frustrating. The intent of this part of the handbook is to outline a process by which the tutor and student can transition to distance tutoring. This process is not fixed; it can and should be adjusted to meet the specific requirements of individual tutors and students. The presented procedure does however addresses a number of issues that must be covered in all transition plans.

The Tutor/Student Relationship

In general, two types of tutor/student pairs will undertake distance tutoring: those who have participated in face-to-face tutoring for some time; and those who have just begun to work together. While the first type of pair may be able to transition relatively quickly to distance tutoring, the pair that has not worked together before may require more preparation.

As indicated in Part 3, distance-tutoring techniques are based primarily upon adaptations of proven face-to-face techniques. Therefore, if the tutor and student have developed a relationship during face-to-face tutoring, the transition to distance tutoring should be relatively straightforward. Essentially, the tutor and student need only adapt their learning practices to the new communications environment. This is not to say that difficulties won't arise, but because the tutor and student have an existing relationship and share a body of experiences, it should be relatively straightforward for them to work through these together.

Tutors and students who are just beginning to work together do not have this shared body of experiences and, consequently, may require greater preparation for distance tutoring. These tutor/student pairs must not only learn how to work at a distance; they must also develop a relationship that will survive the sometimes harsh distance learning environment. Therefore, during the distance tutoring preparation phase, the tutor and student will need time to become familiar with and develop confidence in each other. Similarly, once distance tutoring begins, new tutors and students may require more time than established pairs for "chit-chat" and confidence building activities. These activities are not wasted time and effort but, rather, essential and integral components of distance learning.

Transition Concept

The transition of most tutors and students to distance learning will normally occur in three phases:

- Phase 1 Face-to-face tutoring;
- Phase 2 Transition preparation and training; and
- Phase 3 Adoption of distance learning practices.

Phase 1 – Face-To-Face Tutoring

It is anticipated that before most tutors and students begin distance tutoring, they will carry out at least some face-to-face tutoring together. This face-to-face period is important because it allows the tutor and student to become familiar with one another, to better define learning goals and strategies, and to select learning materials that both the tutor and the student are comfortable with. Bearing in mind that most tutors are not professional educators but only trained volunteers, this period also allows time for tutors to seek advice from their council's' professional staff and other tutors. This period of consultation and support can be extremely important, particularly for new tutors.

As soon as a student and tutor have established a good working relationship, consideration should be given to introducing the use of some technology in face-to-face tutoring sessions. Research indicates that even if there is no intention to move to distance tutoring, use of technology can increase both interest in and the enjoyment of learning. Occasional use of technology in the classroom can also make it easier for the tutor and student to conduct impromptu telephone tutoring sessions, for example on *snow-days* or when the tutor or student has transportation difficulties.

Appendix C illustrates several equipment configurations that can be used in face-to-face tutoring. Most of the equipment in these configurations can be found in most homes. With the use of a telephone line simulation device, this equipment can be configured into both telephone and TDD simulators. These simulators can be used in the classroom to conduct the activities described in Part 3 of this handbook, as well as many others.

Phase 2 - Transition Preparation and Training

Once a tutor and student decide to make distance tutoring a part of their regular routine, they must *jointly* plan how this will occur, complete a number of essential administrative preparations together, and undergo any required training. This preparation and training phase need not be lengthy, but it is critical to the success of distance tutoring.

Several factors will influence the transition plan. These include:

 The prior knowledge of the tutor and student with distance tutoring technologies, practices and techniques;

- the communications technologies that are available to the tutor and student; and
- whether distance tutoring will replace or just supplement face-to-face tutoring.

Some of the issues that the tutor and student must jointly resolve include:

- the technologies that they will use;
- the training they will require in order to use the technologies for distance learning;
- how often they will meet face-to-face, and how often over the telephone;
- who will provide any special equipment that is needed and who will pay for it;
- the learning materials that they will use (workbooks, study guides, dictionaries, thesauruses, newspapers, and so on); and
- the standard materials that they should have available for all distance tutoring sessions (pens, pencils, notepads, and so on).

Both the tutor and the student must also complete a *Distance Tutoring Confidentiality Protocol* prior to initiating distance tutoring. This agreement is intended to safeguard the confidentiality and anonymity of both the tutor and student. The Confidentiality Protocol covers matters such as when to call and not to call, whom messages may be left with, whom telephone numbers may be given to, and so on. A copy of this agreement is at Appendix D.

The tutor must also determine how his or her literacy council wishes him or her to report on distance tutoring and maintain contact with the council. These procedures often will be similar to those used by tutors and students who meet face-to-face away from council facilities.

During the planning phase, it should become apparent what additional training the tutor and student will require before moving to distance tutoring. If the tutor and student have previously used technology in a classroom setting, this training should be minimal. On the other hand, if they have not previously used instructional technologies, it may take longer. In instances where the tutor has no prior experience distance tutoring, some training may also be required with a skilled distance tutor.

Ideally, the tutor and student should go through a variety of exercises in the classroom using the technologies that they will use during distance tutoring. Appendix C illustrates a Telephone/TDD classroom simulator that can be used for this purpose. This simulator replicates a TDD/Telephone home installation and allows the tutor and student to work out procedures in the classroom prior to moving to the distant learning environment. Ideally, when using simulators of this and other types, the tutor and student should use the actual equipment (telephones, TDDs, computers, etc.) that they will use during distance tutoring. This allows them to confirm equipment compatibility and identify any potential equipment problems.

If the tutor and student will be using a TDD during their tutoring sessions, they must become familiar with TTY/TDD abbreviations and how they are used. The most commonly used abbreviations are listed at Appendix E. If the tutor and student have any questions about how these abbreviations should be used, they can consult with an experienced distance tutor or their local office of the Canadian Hearing Society. Instructional manuals and videocassettes are available to assist beginners.

Phase 3 – Implementation of Distance Learning

After distance tutoring has been introduced, it is a good idea for the tutor and student to get together face-to-face after several tutoring sessions to work through any problems that may have arisen in their first few distance learning sessions. Issues that may need to be discussed at this session include:

- learning materials that have worked and that haven't;
- procedures that need to be adjusted and how;
- the balance between face-to-face and distance tutoring;
- the frequency and duration of both distance learning and face-to-face tutoring sessions;
- scheduling issues; and
- equipment issues and problems.

If this meeting is held at a literacy council's offices, this session also will allow the tutor and student to exchange learning materials for new ones if required.

If all goes well after the initial follow-up meeting, it may not be necessary for the tutor and student to meet again to discuss distance tutoring issues specifically. Conversely, if significant adjustments had to be made, a follow-up meeting may be needed after several more lessons to confirm adjustments and do further fine-tuning. In due course, however, it should be possible to extend the time between face-to-face planning meetings. Indeed, if the tutor and student alternate between distance tutoring and face-to-face tutoring, no further special meetings to discuss distance tutoring may be needed; issues that need to be resolved can be covered during regular tutoring sessions. On the other hand, for those who meet primarily at a distance, periodic face-to-face get-togethers may be required to deal with issues and build confidence between the tutor and student. One possible time for such get-togethers is when the tutor and student periodically meet to exchange old learning materials for new ones.

Reference List

- Anderson, J. (1991). Technology and adult literacy. London: Routledge.
- Anderson-Inman, L. & Horney, M.A. (1998). Transforming text for at-risk readers. In D. Reinking, M.C. McKenna, L.D. Labbo, & R.D. Kieffer (Eds.), Handbook of literacy and technology: Transformations in a post-typographic world (pp. 15-43). Mahwah, NJ: Erlbaum.
- Askov, E.N. (2001). What's in a definition? The implications of being defined and strategies for change [Electronic version]. *The Canadian Journal for the Study of Adult Education, 15*(2), 7-18.
- Askov, E.N., Johnston, J., Petty, L.I., & Young, S.J. (2003). Expanding access to adult literacy with online distance education. Retrieved September 19, 2004 from Harvard Graduate School of Education, National Center for the Study of Adult Learning and Literacy Web site: http://ncsall.gse.harvard.edu/research/op_askov.pdf
- Baron, D. (2001). From pencils to pixels: the stages of literacy technologies. (2001). In E. Cushman, E.R. Kintgen, B.M. Kroll & M. Rose (Eds.). Literacy: A critical sourcebook (pp. 70-84). Boston: Bedford/St. Martin's
- Bates, A.W. & Poole, G. (2003). Effective teaching with technology in higher education. San Francisco: Jossey-Bass.
- Behrmann, M. & Jerome, M. K. (2002). Assistive technology for students with mild disabilities (Report No. EDO-EC-02-01). Arlington, VA: ERIC Clearinghouse on Disabilities and Gifted Education. (ERIC Document Reproduction Service No. ED463595)
- Brickman, A., Braun, L.W. & Stockford, M. (2000). An evaluation of the use of technology in support of adult basic education in Massachusetts.

 Retrieved October 11, 2004 from http://www.alri.org/maltt/maltteval.pdf
- Carlin, C. & Steele, V. (1999, December). Technology and adult learning: A collection of current perspectives [Special issue]. *Literacy Practitioner*, 5(2). (ERIC Document Reproduction Service No. ED437503)
- Cartwright, F. & Allen, M.K. (2002). *Understanding the rural urban reading gap*. Ottawa, Ontario, Canada: Statistics Canada. Retrieved September 13, 2004 from http://www.statcan.ca/english/research/81-595-MIE/81-595-MIE2002001.pdf
- Corley, M.A. & Taymans, J.M. (2001) Adults with learning disabilities and the role of self-determination: implications for literacy programs [Electronic

- version]. The Canadian Journal for the Study of Adult Education, 15(2), 149-167.
- Edwards, L., Walsh, K., Mackert, J. & Hamick S. (1995). *Improving student writing skills and attitude through the increase of writing experiences*. Palatine, IL: St. Xavier University. (ERIC Document Reproduction Service No. ED386750)
- Finger, G. & Rotolo, C. (2001, December). *Telephone teaching: Towards constructivist teaching for rural and remote students*. Paper presented at the annual conference of the Australian Association for Research in education, Fremantle, Western Australia, Australia. Retrieved November 1, 2004, from, http://www.aare.edu.au/01pap/fin01158.htm
- Finnie, R. & Meng, R. (2003). *Minorities, cognitive skills and incomes of Canadians*. Ottawa, Ontario, Canada: Statistics Canada. Retrieved June 1, 2004, from, http://www.statcan.ca/english/research/11F0019MIE/11F0019MIE200319 6.pdf
- Franklin, U.M. (1999). The real world of technology (Rev. ed.). Toronto, Ontario, Canada: Anansi.
- Ginsburg, L. (1998). Integrating technology into adult learning. In C. Hopey (Ed.), Technology, basic skills, and adult education: Getting ready and moving forward (pp. 37-46). Columbus, OH: Educational Resources Information Center, Clearinghouse on Adult, Career, and Vocational Education. Retrieved October 11, 2004 from the Texas Center for the Advancement of Literacy and Learning Web site: http://wwwtcall.tamu.edu/erica/docs/hopey/hopey 04.pdf
- Haas, C. & Neuwirth, C.M. (1994). Writing the technology that writes us:
 Research on literacy and the shape of technology. In C.L. Selfe & S.
 Hilligoss (Eds.), *Literacy and computers: The complications of teaching and learning with computers.* New York: The Modern Language Association of America.
- Herod, L. (2000). *Integrating technology into Canadian adult literacy programs:*The need for a curriculum deliberation process. Retrieved October 14, 2004, from http://www.nald.ca/fulltext/herod/march/cover.htm
- Hopey, C. (1998a) Making technology happen in adult education. In C. Hopey (Ed.), *Technology, basic skills, and adult education: Getting ready and moving forward* (pp. 3-9). Columbus, OH: Educational Resources Information Center, Clearinghouse on Adult, Career, and Vocational Education. Retrieved October 11, 2004 from the Texas Center for the

- Advancement of Literacy and Learning Web site: http://www-tcall.tamu.edu/erica/mp hopey 01.asp
- Hopey, C. (1998b) Recommendations for using technology in adult education. In C. Hopey (Ed.), *Technology, basic skills, and adult education: Getting ready and moving forward* (pp. 47-48). Columbus, OH: Educational Resources Information Center, Clearinghouse on Adult, Career, and Vocational Education. Retrieved October 11, 2004 from the Texas Center for the Advancement of Literacy and Learning Web site: http://www-tcall.tamu.edu/erica/docs/hopey/hopey_05.pdf
- Hopey, C.E., Harvey-Morgan, J. & Rethemeyer, R.K. (1996). *Technology and adult literacy: Findings from a survey on technology use in adult literacy programs* (NCAL Technical Report No. TR96-12). Retrieved October 14, 2004, from the University of Pennsylvania, National Center on Adult Literacy Web site: http://www.literacyonline.org/products/ncal/pdf/TR9612.pdf
- Howie, S.H. (1994). Adult literacy in a multiliterate society. In M.C. Radencich (Ed.), *Adult literacy: A compendium of articles from the Journal of Reading* (pp. 181-200). Newark, DE: International reading Association.
- Human Resources Development Canada. (2002). Adult literacy: Policies, programs and practices: Lessons learned (Report No. SP-AH113E-03-00). Retrieved September 13, 2004 from http://www11.hrdc-drhc.gc.ca/pls/edd/ALPPP 137000.htm
- Imel, S. (1996). Adult literacy education: Emerging directions in program development (Report No. EDO-CE-96-179). Washington, DC: Office of Educational Research and Improvement. (ERIC Document Reproduction Service No. ED402475)
- Imel, S. (1999). Using Technologies effectively in adult and vocational education. *Literacy Practitioner*, *5*(2), 12–14.
- Jaffee, L.L. (2001). Adult literacy programs and the use of technology. *Adult Basic Education 11(*2), 109-24.
- Kamil, M.L., Intrator, S.M. & Kim, H.S. (2000). The effects of other technologies on literacy and literacy learning. In M.L. Kamil, P.B. Mosenthal, P.D. Pearson & R. Barr, (Eds.) *Handbook of reading research* (Vol. 3) (pp. 771-788). Mahwah, NJ: Erlbaum.
- Kunz, J.L. & Tsoukalas, S. (2000). Riding the technological wave: Experiences of adult literacy students and teachers in Ontario. Ottawa, Ontario, Canada: Canadian Council on Social Development.

- Knuth, R., Hopey, C. & Rocap, K. (Eds.) (1996). Guiding questions for technology planning: Version 1.0. Retrieved October 11, 2004, from http://www.ncrtec.org/capacity/guidepdf/guide.pdf
- Lang, H.G. (2000). A phone of our own: The deaf insurrection against Ma Bell. Washington: Gallaudet University Press.
- Laubach Literacy Canada. (2003). *Laubach enhanced training system*. Retrieved June 23, 2004, from http://www.laubach.ca/updater.pdf
- Leu, D.J. (2000). Literacy and technology: Deictic consequences for literacy education in an information age. In M.L. Kamil, P.B. Mosenthal, P.D. Pearson & R. Barr (Eds.). *Handbook of reading research* (Vol. 3) (pp. 743-770). Mahwah, NJ: Erlbaum.
- Marshall, S., Nussbaum, D., & Waddy-Smith, B. (1999). Kendall School Integrates Literacy Skill Development with Auditory and Speech Services. In *Perspectives in Education and Deafness, 17*(5). Retrieved 15, November 2004, from http://clerccenter.gallaudet.edu/Products/Perspectives/may-jun99/marshall.html
- Mason, T. (2001). Philosophies of adult education movements in 20th century Canada: implications for current literacy educators [Electronic version]. *The Canadian Journal for the Study of Adult Education*, *15*(2), 61-78.
- McKenzie, B. (1993). Working in literacy with deaf and hard of hearing adults: Sample tutoring Session # 2. Ottawa, Ontario, Canada: The Capital Region Centre for the Hearing Impaired Literacy Program.
- Mingle, M.E.H. (1999) Strategies for the 21st Century: Integrating technology into the ABLE environment. Lock Haven: University of Pennsylvania, West Branch Technology Center. (ERIC Document Reproduction Service No. ED435823)
- Ministry of Training, Colleges and Universities. (2000). *Literacy Ontario: Literacy and basic skills program guidelines*. Toronto, Ontario, Canada: Queen's Printer for Ontario.
- Movement for Canadian Literacy (2004). Factsheet: Literacy in Canada. Retrieved October 15, 2003 from http://www.literacy.ca/litand/1.htm
- Olgren, C.H. (1997). Teaching by telephone. In *New directions for teaching and learning*, 71. 59-66.

- Ontario Rural Literacy Special Interest Group (1994). *Distinct needs of rural literacy programs*. Retrieved March 18, 2004, from http://www.nald.ca/fulltext/report2/rep18-01.htm
- Padolina, M.C.D. (1997, May). *Use (and misuse) of technology in distance education.* Paper presented at the Asia Literacy Regional Forum. Manila, Philippines. (ERIC Document Reproduction Service No. ED416313)
- Reinking, D. (1998) Introduction: Synthesizing technological transformations of literacy in a post-typograhic world. In D. Reinking, M.C. McKenna, L.D. Labbo, & R.D. Kieffer (Eds.), *Handbook of literacy and technology:*Transformations in a post-typographic world (pp. xi-xxx). Mahwah, NJ: Erlbaum.
- Rekkedal, T. (1989). The telephone as a medium for instruction and guidance in distance education: Report from an experiment at NKI, Norway.

 Bekkestua, Norway: Norwegian Centre for Distance Education.
- Robinson, B. (1984). Telephone teaching. In A.W. Bates, (Ed.), *The role of technology in distance education*, 121-138. Beckenham, Kent, U.K.: Croom Helm.
- Schram, W. (1977). Big media, little media: Tools and Technologies for instruction. London: Sage.
- Selfe, C.L. (1999), *Technology and literacy in the twenty-first century.*Carbondale: Southern Illinois University Press.
- Simpson, O. (2002). Supporting students in online, open and distance education (2nd ed.). :London: Kogan Page.
- Skinner L., Gillespie P. & Balkam, L. (2000). The challenge of adult literacy: Students with learning disabilities in the ABE classroom. *Adult Basic Education* 10(3), 147-166.
- Smith, J. (1999). Literacy, welfare and work: Longitudinal research project final report. Retrieved 1 November 2004 from http://www.nald.ca/fulltext/lwwfinal/lww3.pdf
- Turner, T. C. (1993). Literacy and machines: An overview of the use of technology in adult literacy programs (Rep. No. TR 93-3). Retrieved October 14, 2004, from the University of Pennsylvania, National Center on Adult Literacy Web site: http://www.literacyonline.org/products/ncal/pdf/TR9303.pdf

- Turner, T. C. (1998). Technology in adult education programs. In C. Hopey (Ed.), Technology, basic skills, and adult education: Getting ready and moving forward (pp. 59-70). Columbus, OH: Educational Resources Information Center, Clearinghouse on Adult, Career, and Vocational Education. Retrieved October 11, 2004 from the Texas Center for the Advancement of Literacy and Learning Web site: http://wwwtcall.tamu.edu/erica/docs/hopey/hopey 07.pdf
- Waterhouse, P., Mildenhall, B. & Sefton, R. (1987). Gippsland Distance Literacy Project: Resource Kit for Distance Adult Literacy Tutors. Churchill, Victoria, Australia: Yallourn College of Technical and Further Education.
- Wilson-Lum, C. (1991). *Teaching TTY/TDD Skills*. Ottawa, Ontario, Canada: The Capital Region Centre for the Hearing Impaired Literacy Program.
- Zucker, H. (1986). *Distance education in rural areas*. Rome, NY: Syracuse University.

APPENDIX A

STUDY	REGORD AND PLAN	Student	
	d Together by the Tutor and Student)	Date	
Goal of This Lesson (Fill in at Beginning of Lesson)			
	Accomplishmer (Fill in During Lesso		
The following	was accomplished during this les		
	Homework (Fill in During Lesso	on)	
Book		vities	
Book	PagesActi		
	Pages Acti	vities	
Other			

Next Lesson

(Fill in at End of Lesson)

Date	_ Time	Location/Telephone No	*
Goal			
			
Special Materials Ne	eded		
	(Reco	ofterthoughts and Between Lessons)	

^{*} Telephone No is needed only for telephone/TDD tutoring sessions

APPENDIX B

SAMPLE OF AN INDIVIDUAL STUDY PLAN TDD MESSAGE



TDD Printing

The TDD printer prints one person in capital letters and the other person in small letters so conversations are easier to follow.

Appendix C Configuration of Equipment

General

Two advantages of using telephones and TDDs for tutoring over other technologies are that these technologies are easy to connect and configure, and most individuals are familiar with them. This having been said, TDDs and telephones can be configured in a variety of different ways for both classroom and distance tutoring applications. This section describes five of the most common equipment configurations and identifies situations where each type of configuration is appropriate.

The most common equipment configurations are:

- The TDD/Telephone home installation;
- The telephone simulator;
- The TDD simulator;
- The TDD/Telephone simulator; and
- The TDD small group instruction suite.

Note: In this Appendix, only representative equipment configurations are illustrated. For safety reasons and to prevent equipment damage, always refer to applicable equipment manuals before connecting devices.

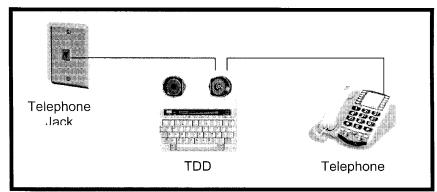
Standard TDD/Telephone Installation

The standard TDD/Telephone installation for homes and offices (Figure C1) is used for literacy tutoring at a distance. This installation is also the standard setup used by the hearing impaired for communications purposes.

The Standard TDD/Telephone Installation allows tutors and students to communicate in a variety of different ways:

 Voice-to-voice. The telephones function normally allowing the tutor and student to carry out oral conversations and exercises such as read alongs, spelling activities, and so on.

- Text-to-text. Information typed on one device simultaneously appears on the other device. The tutor and student can carry out written conversations and exercises.
- Voice Carry Over (VCO). One communicant can speak and read while the other communicant listens and writes. This allows, for example, for the tutor to give oral instructions to the student, and the student to respond in writing. Conversely, the student could be asked to orally respond to written questions from the tutor.



<u>Figure C1</u>. In the standard TDD/Telephone installation a TDD is plugged into a standard analogue telephone jack, and a telephone is plugged into a jack on the TDD. When the TDD is not required, the telephone can be used normally

If a speakerphone is used instead of a standard telephone in this configuration, this setup can be used to support one-to-many small group instruction; one tutor can support two or more students who share the same speakerphone and TDD. Alternately, by using three way calling or conference calling, one tutor can support multiple learners in different locations. Local telephone companies should be consulted for details on how to set up three way calls and conference calls. *Note: Additional telephone charges normally apply to such calls.*

If the home or office is equipped with a digital telephone line, the telephone cannot be connected directly to a telephone jack and the telephone's handset must be cradled in the TDDs acoustic couple for the TDD to work. While the handset is cradled in the TDD, VCO capability is lost.

Telephone Simulator

The telephone simulator (Figure C2) is used to practice telephone activities in the classroom without having to connect to the telephone system.

This installation can be used to teach skills such as answering the telephone at a business, taking messages, and so on. Tutors may also use this installation to practice telephone-tutoring techniques with each other.

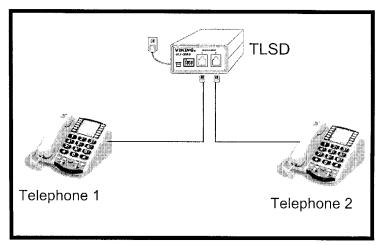
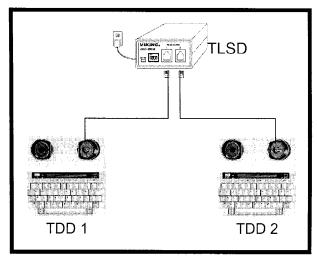


Figure C2. Telephone Simulator

The TLSD in this and other installations provides a dial tone and ring response capability without having to connect to the normal telephone system.

TDD Simulator

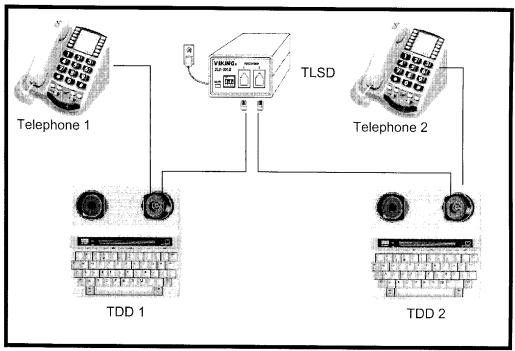
The TDD Simulator (Figure C3) is similar to the Telephone Simulator, but two TDDs replace the telephones in the configuration. This simulator can be used to tutor written literacy skills in the classroom, as well as provide tutors with a means to practice their TDD tutoring techniques. Using TDDs, the communicants are able to communicate exactly as they would over the telephone system. During tutoring sessions, oral dialogue is carried out face-to-face without recourse to technology.



<u>Figure C3</u>. TDD Simulator. Two TDDs are connected together using a TLSD. The TDDs can either be in the same or nearby rooms.

.TDD/Telephone Simulator

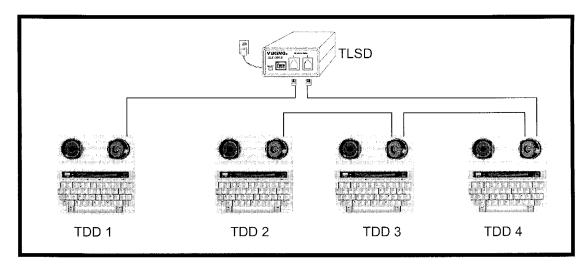
The TDD/Telephone Simulator (Figure C4) is employed to teach communications protocols before the tutor and student begin to use TDDs and telephones at a distance. The tutor and student each have a telephone and TDD so they have the same communications capabilities as in a Standard TDD/Telephone Installation.



<u>Figure C4</u>. In the TDD/Telephone Installation Simulator, two TDDs are connected to a single TLSD, and a telephone is plugged into each TDD. The two TDD/Telephone installations can be either in a single room or two nearby rooms

TDD Small Group Instruction Suite

The TDD Group Instruction Suite (Figure C5) is used for small group instruction. The suite allows three or more devices to be connected together. It can be used for a variety of activities described in the handbook when more than one student is to be instructed at a time. It can also be used for *Game Show* activities in which either the tutor or a student acts as host, and students act as contestants.



<u>Figure C5</u>. TDD Small Group Instruction Suite. Three or more TDDs are linked together using a single TLSD. The TDDs can either be in the same or nearby rooms. The Tutor would normally use TDD 1.

APPENDIX D DISTANCE TUTORING CONFIDENTIALITY PROTOCOL

Primary	Phone No	Location	on	Time	
Alternate					
Cell				4.4	
hese numbers a	re to be kept confi	dential: YES	NO (Circle	One)	
Messages					
	e left at the above not want message		e names of the in	ndividuals listed	below. (Ti
	Phone No		Messages May	y Be Left With	
		No one		Names	
Primary					
Alternate					
Cell					
Messaging Mach Voice or text mes service.)	nines sages may be left	at these number	s as indicated b	elow. (Tick Yes	or <i>No</i> for e
	Phone No	1	Type of Mess	sage Service	
	T HONG TVO	Vo	ice	ssage Service Text	
		Yes	No	Yes	No
Primary					
Primary Alternate Cell				1	

APPENDIX E TTY/TDD ABBREVIATIONS

СНАР	CHAPTER. For example, CHAP 9 means chapter 9
GA	GO AHEAD. I have finished typing and you may go ahead and type.
GA SK or GA OR SK or GA TO SK or SK TO GA	GO AHEAD to STOP KEYING. <i>I am ready to end the conversation</i> . This is the polite way to signal that you have finished and you are giving him or her a chance to say any last words.
HD	HOLD. I will be away from the TTY for a moment.
P followed by number	PAGE. For example: P 5 means page 5
PARA	PARAGRAPH. For example: PARA 7 means paragraph 7
Q or	QUESTION or QUESTION MARK.
	Sometimes used instead of a question mark "?"
QQ or	Can be used in instructions such as "Do Q 4" – "Do question 4."
QM	When used before a line, it means that the statement that follows is a question not a statement. For example, "QQ The dog was black GA" means, "Was the dog black?"
SK	STOP KEYING. I am ready to end the call
	This is used only after the other person has concluded his or her remarks with GA SK, or one of its alternatives.
SK PU	STOP KEYING. PICK UP. I have to talk to you. Stop keying and pick up the handset.
	This code is only used in literacy tutoring. Other TTY/TDD users won't know it.

SK SK	STOP KEYING STOP KEYING. The conversation is over. I am now hanging up.
	This is used only after the other person has finished with SK.
xxxx	Forget about what I just typed. A correction follows.

Note: Deaf TTY/TDD users use many other abbreviations, but these are not normally used in literacy tutoring.

SAMPLE TTY CONVERSATION GA Go ahead HI JOHN. IT'S MARY GA4 P1. HI MARY, WHAT TIME WILL YOU BE HERE? GA P2. P1. QQ ABOUT 3 GA GA TO SK I'm ready to end the conversation. 3 IS FINE. GA TO SK P2. P1. SEE YOU THEN SK SK I'm ready too. BYE SK SK 🔨 P2. SK SK The conversation is over. I'm hanging up.

Appendix F International Phonetic Alphabet

Letter	Word	Pronunciation	Letter	Word	Pronunciation
Α	ALPHA	AL FAR	N	NOVEMBER	NO <u>VEM</u> BER
В	BRAVO	BRAH VOH	0	OSCAR	OSS CAH
С	CHARLIE	CHAR LEE	Р	PAPA	PAH <u>PAH</u>
D	DETLA	DELL TAH	Q	QUEBEC	KEH <u>BECK</u>
E	ECHO	ECK OH	R	ROMEO	ROW ME OH
F	FOXTROT	FOKS TROT	s	SIERRA	SEE <u>AIR</u> RAH
G	GOLF	GOLF	Т	TANGO	TANG GO
Н	HOTEL	HOH <u>TELL</u>	U	UNIFORM	YOU NEE FORM
ı	INDIA	IN DEE AH	V	VICTOR	<u>VIK</u> TAH
J	JULIET	JEW LEE ETT	W	WHISKEY	<u>WISS</u> KEY
K	KILO	KEY LOH	X	X-RAY	ECKS RAY
L	LIMA	LEE MAH	Υ	YANKEE	YANG KEY
М	MIKE	MIKE	Z	ZULU	<u>ZOO</u> LOO

APPENDIX D

DATA COLLECTION AND ANALYSIS PLAN

	Student Focus Group	×			×
lool	Artefact Retrieval	×			×
llection 7	Questionnaire	×		×	×
Appropriate Data Collection Tool	səinsi Q	×			×
oropriate	noitsvrəadO	×			×
App	swəivrətri	×		×	×
	Documentary Material			×	
Data Requirement		Attitudes of tutors and learners to the use of	technology in general	The literacy goals of individual learners	The comfort and confidence of tutors and learners with using technology for learning
Serial		<u>.</u>		2.	က်

4	The prior knowledge of tutors and students with technology in general and TDDs in particular	×	×					
5.	How easily tutors and students are able to learn to		×	×	×	×	×	×
	properly install and operate the TDD.							
9.	How tutors and learners use the TDDs to support		×	×	×	×	×	×
	learning including what worked and what didn't				· · ·			-
7.	The frequency and duration that tutors and learners		×		×	×		
	use TDDs to support learning							
ω.	Impediments to effective use of the TDD that		×	×	×	×		×
	participants encountered							-
7.	The attitudes of tutors and tutors towards		×	×	×			×
	transitioning to computer based instruction				,			

Note: Instruments in shaded columns were added after adoption of action research framework.

Appendix E

TDD RESEARCH PROJECT COMMENT SHEET

Please complete and leave in office

Name (Optional)		Date	
I am a BLC Student	: BLC Tutor BLC	Staff Member Oth	er (Circle One)
Start TimeA	AM/PM End Time	AM/PM	
Have you ever used a	a TDD/TTY before? (0	Circle One) Yes No	
Do you use a comput	er? (Circle One)		
NEV	ER	SOMETIMES	A LOT
Were you able to get	the TDD to connect a	nd work OK? (Circle On	e) Yes No
What did you use the	TDD for? (Circle One or N	∕lore)	
a. to fool aro	und with – experiment		The second secon
b. to do a sa	mple exercise from the	e Distance Tutoring F	łandbook.
c. Other thin	gs. (please explain)		""明明传统《福安·
		: x	
Did you enjoy using t	he TDD today? (Circle	One)	
Not at all	Abit	A lot	
How useful do you th	ink TDDs would be in	normal tutoring? (Circl	le One)
Not at all	A bit	Very Useful	I
	ink TDDs would be if t a leg and could not n		ne over the telephone – for ng? (Circle One)
Not at all	A bit	Very Useful	Ī
			elephone line that you could nrough a cell phone? (Circle
Yes	No	Sometimes	
Other Comments: (Ple	ease write on back)		

APPENDIX F

FRAMEWORK FOR EVALUATING THE POTENTIAL OF TECHNOLOGY FOR SUPPORTING ADULT LITERACY INSTRUCTION

Adapted from Anderson (1991), Technology and Adult Literacy. Used with permission.

Questions For Administrators To Ask About Technology

The following seven criteria comprise questions for administrators to ask about technology in literacy programs:

Objectives

Are there clearly stated educational objectives? Are the objectives important for literacy units/schools and students?

Rate Objectives: (Circle one)

Important 7 6 5 4 3 2 1 Not important

Outcomes

How does the technology compare with other equipment and materials? Is there evidence that the technology is educationally effective? Are there benefits for students and/or teachers?

Rate Outcomes: (Circle one)

Satisfactory 7 6 5 4 3 2 1 Not satisfactory

<u>Approach</u>

Does the technology offer new approaches to teaching and/or learning? Does the technology enable educational activities that other technology cannot?

Are teachers supportive about the approach adopted?

Rate Approach: (Circle one)

Supportive 7 6 5 4 3 2 1 Not supportive

Access

Will the technology be useful for a wide range of students? Is it intended that

one student, a small group or a large group use the equipment? Does the

technology have the potential to be used by many students or only a few? Will

price and/or mode of use preclude students from utilizing the technology? Will

some students be precluded from using the technology for cultural reasons?

Is special assistance necessary in order that all students have the opportunity

to use the technology?

Rate Access: (Circle one)

Accessible 7 6 5 4 3 2 1 Not accessible

Management

Does equipment have to be set up before students use it, or can students set

it up themselves? How time-consuming is it to set up any equipment or shut it

down? Are the services of a technician required, or can it be easily set up by

students and teachers? Does the equipment require a number of people or

other resources for it to be used, or can it be easily used by an individual in a

stand-alone form?

Rate Management: (Circle one)

Manageable 7 6 5 4 3 2 1 Not manageable

Service/Support

What on-going support or servicing is there for the product? Are there

informed and appropriate specialist advisory staff to assist teachers if

problems arise? Will modifications of the product make current models

obsolete? Will updated versions or accompanying support materials be

readily available?

Rate Service/Support: (Circle one)

Good 7 6 5 4 3 2 1 Poor

Costs

Are costs primarily capital? Are there extra costs in providing adequate and

compatible hardware? Are there accompanying learning materials to support

the technology? Are there personnel costs involved in using the technology?

Will there be training costs before the technology can be used effectively? Are

there going to be on-going costs for servicing? Will there be on-going costs

for materials/software? Are there costs in the production and delivery of the

technology? Will there be any savings if the technology is used?

Rate Costs: (Circle one)

Reasonable 7 6 5 4 3 2 1 Not reasonable

Questions for teachers to ask about technology

The following questions for teachers to ask about technology in their teaching

are organized around twelve criteria:

Objectives

Are the educational objectives clearly stated? Is an objective that students'

learning be facilitated using the technology? Is an objective that students

learn how to use the technology? What are students expected to learn by

using the technology?

Rate Objectives: (Circle one)

Important 7 6 5 4 3 2 1 Not important

Outcomes

Is there evidence that the technology is effective in meeting its aims and

objectives? How will the technology be deployed to achieve its educational

objectives? What would teachers like to occur in using the technology? Are

other means of learning as effective as the 'new technology'? Can existing

tools or equipment achieve similar outcomes?

Rate Outcomes: (Circle one)

Satisfactory 7 6 5 4 3 2 1 Not satisfactory

Approach

Does use of the technology reflect current thinking on language a

development of literacy? Is the approach underlying the technology

acceptable to teachers Are the technology and associated materials

compatible with you approach to language and learning?

Rate Approach: (Circle one)

Compatible 7 6 5 4 3 2 1 Not compatible

Interest level

Do teachers want to use the technology with their students? Is the technology

of high interest to students?

Rate Interest Level: (Circle one)

High 7 6 5 4 3 2 1 Low

Appropriateness

Are effective and appropriate teacher support materials available? Does the

technology allow students to make choices about their learning? Does the

technology become the teaching environment, or a tool that environment?

Does the technology combine effectively with previous methods? How

appropriate is it for students to be using the technology at this time? Does

using the technology assist in achieving students' learning objectives?

Rate Appropriateness: (Circle one)

Appropriate 7 6 5 4 3 2 1 Appropriate.

<u>Flexibility</u>

Can the technology be easily integrated into the classroom? Can the

technology be adapted for use with different levels or abilities of students? Is

the equipment best used on a one-to-one basis or with groups of students?

Does the technology have a wider application than that originally intended?

Can the technology be used with other equipment to extend its flexibility? Is

the approach flexible enough to allow adaptation?

Rate Flexibility: (Circle one)

Flexible 7 6 5 4 3 2 1 Not Flexible.

215°

<u>Adaptability</u>

Can the technology be used without modification? When used by students, do

equipment or materials need adaptation? Can the educational content of

learning materials be adapted by teachers? Is the technology modifiable for

different student needs?

Rate Adaptability: (Circle one)

Adaptable 7 6 5 4 3 2 1 Not adaptable

Learning

Does the technology allow students to interact with the material, to learn at

their own pace, to learn at a time convenient to them, or to learn in a style that

suits them? Does the technology allow active learning or are students passive

recipients?

Rate Learning: (Circle one)

Active 7 6 5 4 3 2 1 Passive

Familiarity

Does the teacher need to be familiar with the technology in order for it to be

used? Do teachers feel sufficiently prepared to use the technology? Can

students use the technology without being totally familiar with it?

Rate Familiarity: (Circle one)

Familiar 7 6 5 4 3 2 1 Not familiar

Portability

Can the equipment be readily transported according to the situation in which it

is needed? Could students use the equipment at home if it were made

available for that purpose? Does the equipment need a skilled technician to

set it up, or can this be done by the teacher?

Rate Portability: (Circle one)

Readily portable 7 6 5 4 3 2 1 Not readily portable

Convenience

Is it time consuming for students to gain access to the technology? Does the

technology have to be specially set up before a student can use it, or can

students set it up themselves?

Rate Convenience: (Circle one)

Convenient 7 6 5 4 3 2 1 Not convenient

Ease of use

Does the technology leave students or teachers feeling bewildered? Have

teachers received adequate preservice or inservice education in the use of

the technology? Does the technology require much time for it to be mastered?

Can the technology be effectively used without a complete understanding or

mastery of it? Does use of the technology need constant referral to

documentation?

Rate Ease of Use: (Circle one)

Simple 7 6 5 4 3 2 1 Difficult

Questions for adult learners to ask about technology

The following six criteria comprise questions for adult learners to ask about

technology used in literacy learning:

Expectations

What do students expect to learn by using the technology? What would

students like to happen when using the technology? Do students expect their

learning to be effective when using the technology?

Rate Learner's Expectations: (Circle one)

High 7 6 5 4 3 2 1 Low

Needs

Does using the technology assist students in achieving their learning

objectives? Does the technology allow a choice in the way students learn? Do

students prefer to use the technology on their own, or with a group of people,

or both? Are other means of learning better for students than the 'new

technology? Does the technology provide an effective way for students to

learn for their current needs?

Rate Learner's Needs: (Circle one)

Met 7 6 5 4 3 2 1 Not met

Feedback

Is the response time in interacting with the equipment acceptable? Does the

technology provide feedback to learners about their performance?

Rate Feedback: (Circle one)

Positive 7 6 5 4 3 2 1 Negative

Interest level

Do students like learning using the technology? Does the technology help

students to want to learn more? Do students find this way of learning more

interesting than other ways?

Rate Interest Level: (Circle one)

High 7 6 5 4 3 2 1 Low

Learning

Does the technology allow students to interact with the material? Does the

technology allow learning at an individual pace? Does the technology allow

students to learn at a time convenient to them? Does the technology allow for

individual learning styles?

Rate Learning: (Circle one)

Active 7 6 5 4 3 2 1 Passive

Ease of use

Does the technology leave students feeling bewildered at all? Does the

technology require much time for it to be mastered? Can the technology be

effectively used without a complete understanding or mastery of it? Does the

technology help students to learn how to use it? Do students have to ask

someone else to set up the technology, or can they set it up themselves?

Is the technology easy to use?

Rate Ease of Use: (Circle one)

Simple 7 6 5 4 3 2 1 Difficult